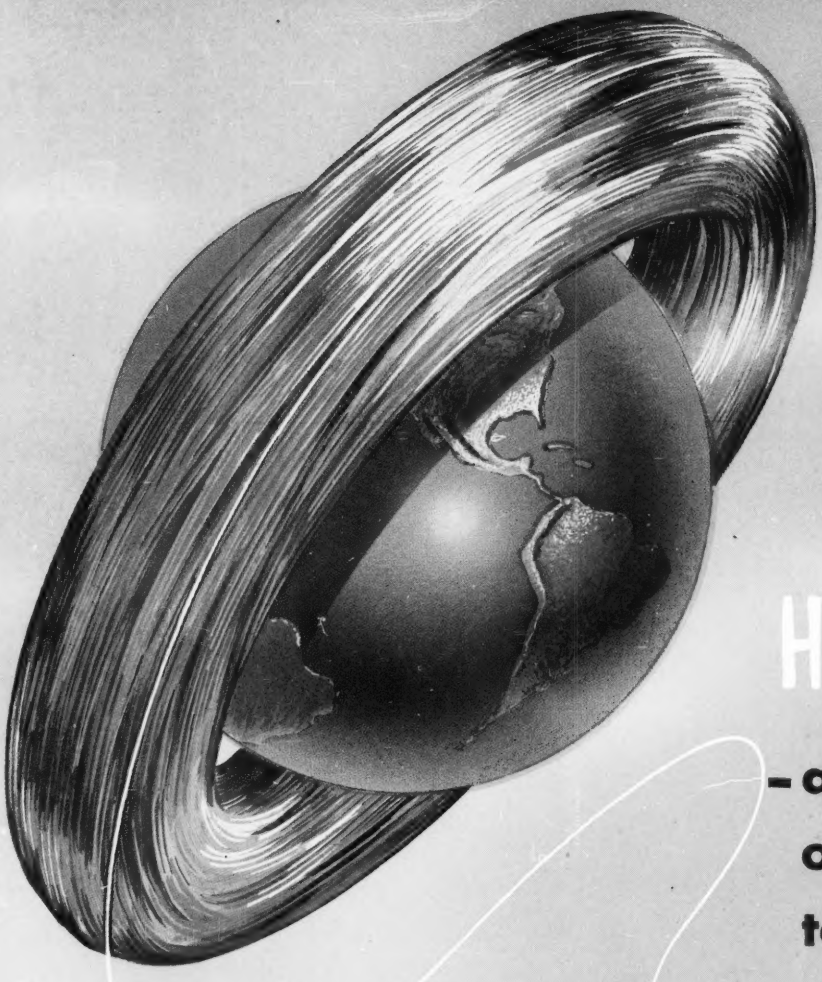
JANUARY 1953

WIRE AND WIRE PRODUCTS



Happy New Year

– and a world of good wire to you

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CUYAHOGA FALLS, OHIO, U.S.A.

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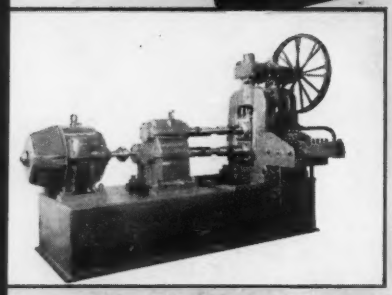
"Quick on the Draw!"
VAUGHN® MACHINERY
PROFITABLY USED BY LEADING WIRE MILLS SINCE 1871

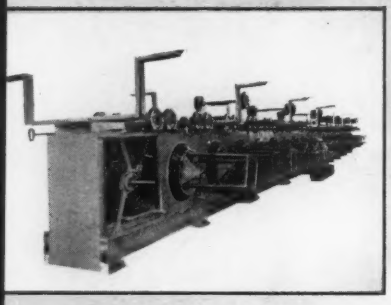
OFFICIAL PUBLICATION OF THE WIRE ASSOCIATION

LOOK TO Wean FOR WIRE MACHINERY

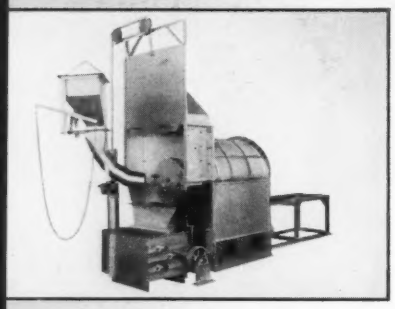
Process OR Product



2—Hi Wire Flattening Mill



Wire Galvanizing Take-Up Frame

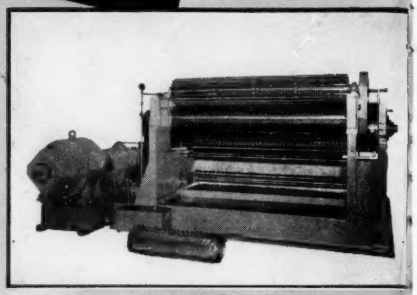


Nail Galvanizing Unit

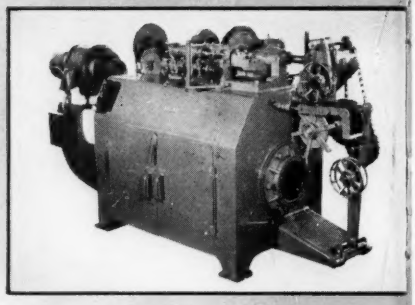
In the past few years tremendous progress has been experienced in the field of wire machinery. Production speeds have been tripled and quadrupled. Product quality has been greatly improved. Machines have been made easier to operate and maintain.

The Wean Equipment Corporation has been a large contributor to this advancement. Wean wire mill specialists have designed, built, and installed wire mill equipment for the leading wire producers the world over. If you make wire you should look to Wean for the best in machinery, service, and facilities.

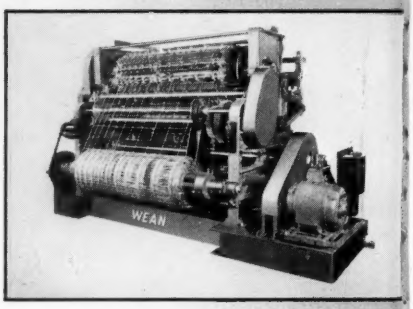
STRIP MACHINERY



Hexagon Netting Machine



2 or 4—Point Barbed Wire Machine



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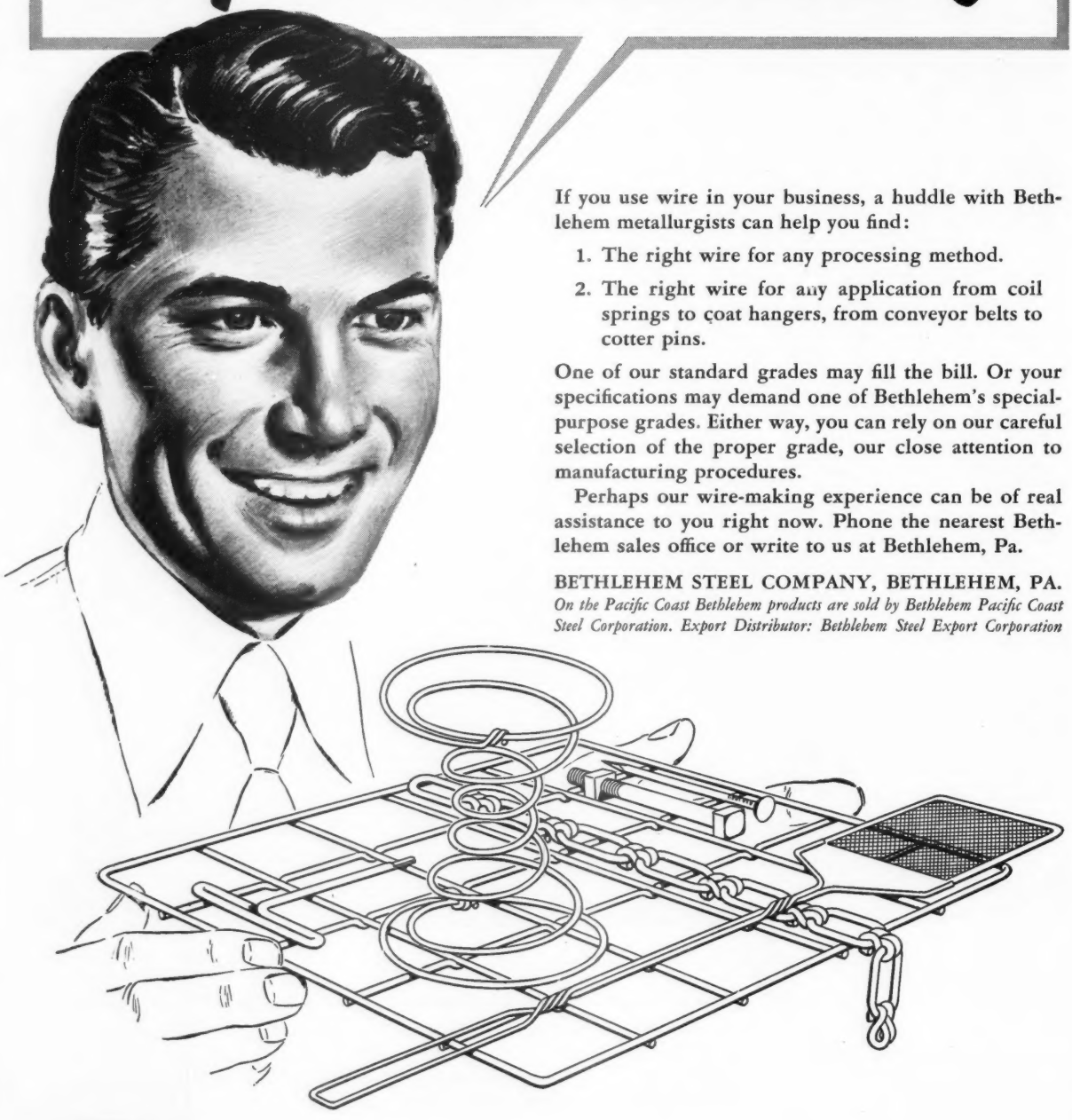

If you use wire in your business, a huddle with Bethlehem metallurgists can help you find:

1. The right wire for any processing method.
2. The right wire for any application from coil springs to coat hangers, from conveyor belts to cotter pins.

One of our standard grades may fill the bill. Or your specifications may demand one of Bethlehem's special-purpose grades. Either way, you can rely on our careful selection of the proper grade, our close attention to manufacturing procedures.

Perhaps our wire-making experience can be of real assistance to you right now. Phone the nearest Bethlehem sales office or write to us at Bethlehem, Pa.

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BETHLEHEM STEEL

BETHLEHEM WIRE

Regional Meeting in Montreal on May 7th and 8th Taking Shape

The Program Committee reports progress in the formulation of a series of technical papers, having under consideration approximately ten subjects of interest to ferrous and non-ferrous Wire Association members. Selection of these papers that will have the broadest interest will be made shortly and announced in February in this publication.

Technical papers will be presented on May 8th at the Mount Royal Hotel, Thursday, May 7th, being set aside for plant inspection trips and the banquet in the evening.

The program committee is comprised of the following:

CHAIRMAN

Allan B. Dove, Steel Company of Canada Ltd.
Lachine, Canada

MEMBERS

T. B. Tracey, Canadian General Electric Company, Ltd., Montreal, Can.

G. Layt, Steel Company of Canada Ltd., Montreal, Can.

G. McCracken, Aluminum Company of Canada Ltd., Shawinigan Falls, Can.

W. Walker, Phillips Electrical Works Ltd., Montreal, Can.

W. Nord, Canada Wire and Cable Co. Ltd., Montreal East, Can.

T. R. Jopling, Canadian Tube and Steel Products Ltd., Montreal, Can.

A. Lauder, Phillips Electrical Works Ltd., Brockville, Can.

T. Cornelius, Aluminum Company of Canada, Montreal, Can.

H. B. Carnahan, Canada Wire & Cable Co. Ltd., Leaside, Can.

R. S. Hull, Canadian General Electric Co. Ltd., Peterborough, Can.

R. E. Brown, Wire and Wire Products
Stamford, Conn.

Reservation cards will be mailed in due course to Association members, but it would be well to make your plans now to go to Montreal in May. Members may bring guests.

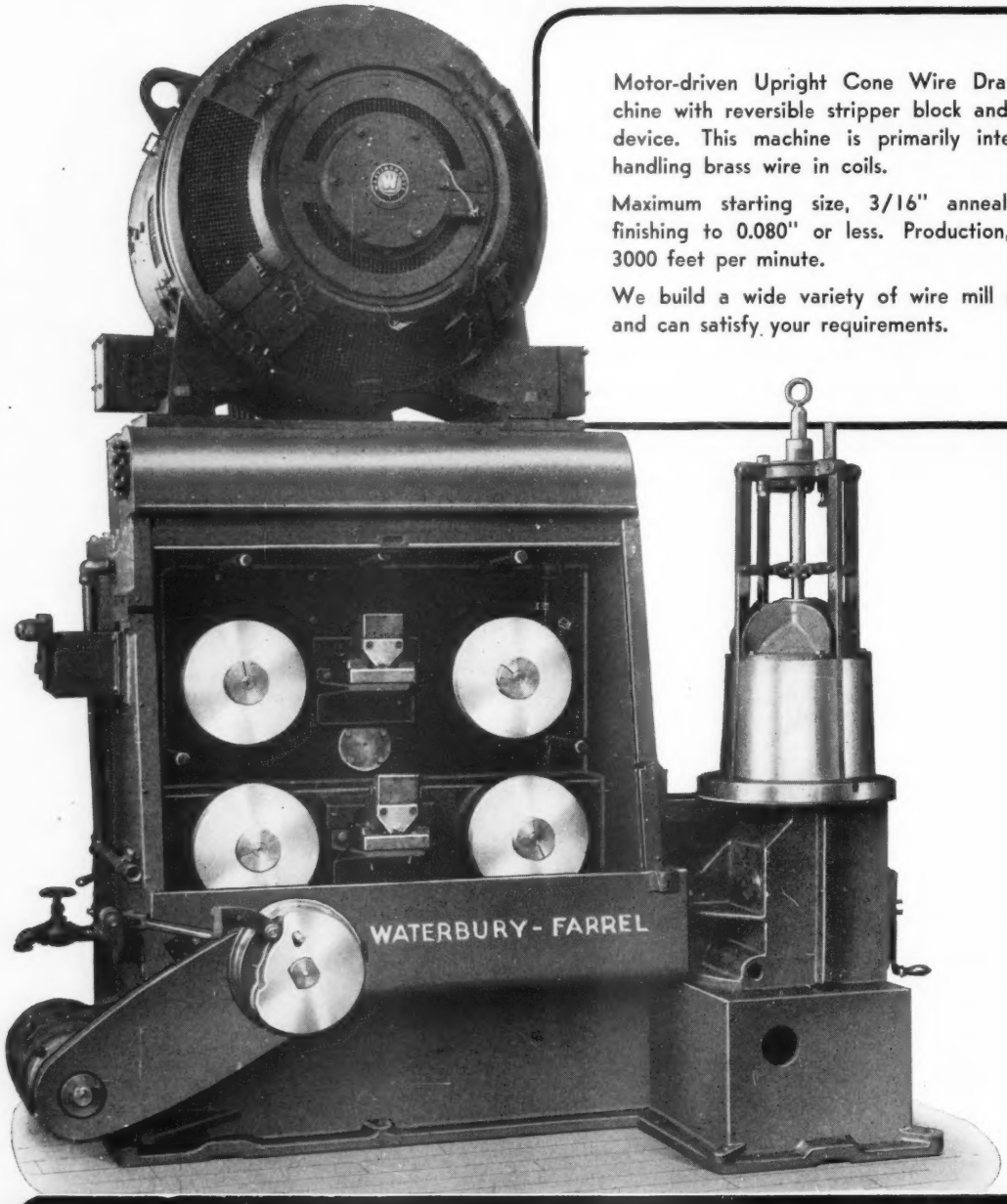
THE WIRE ASSOCIATION

Richard E. Brown, *Executive Secretary*

453 MAIN STREET **STAMFORD, CONN.**

Just one in a wide variety of . . . .

WIRE DRAWING MACHINES



Motor-driven Upright Cone Wire Drawing Machine with reversible stripper block and string-up device. This machine is primarily intended for handling brass wire in coils.

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We build a wide variety of wire mill machinery and can satisfy your requirements.

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A monthly publication devoted to the production of Wire, Rod and Strip, Wire and Rod Products and Insulated Wire and Cable.

DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 28 JANUARY, 1953 No. 1

Designated as Official Publication By The Wire Association

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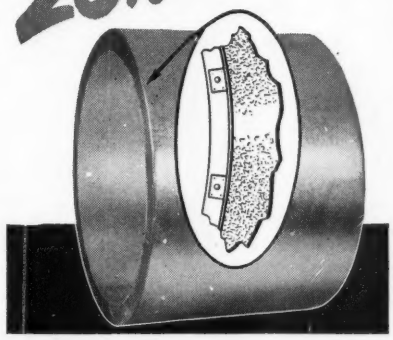

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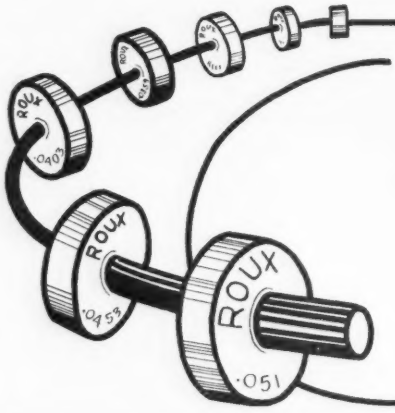

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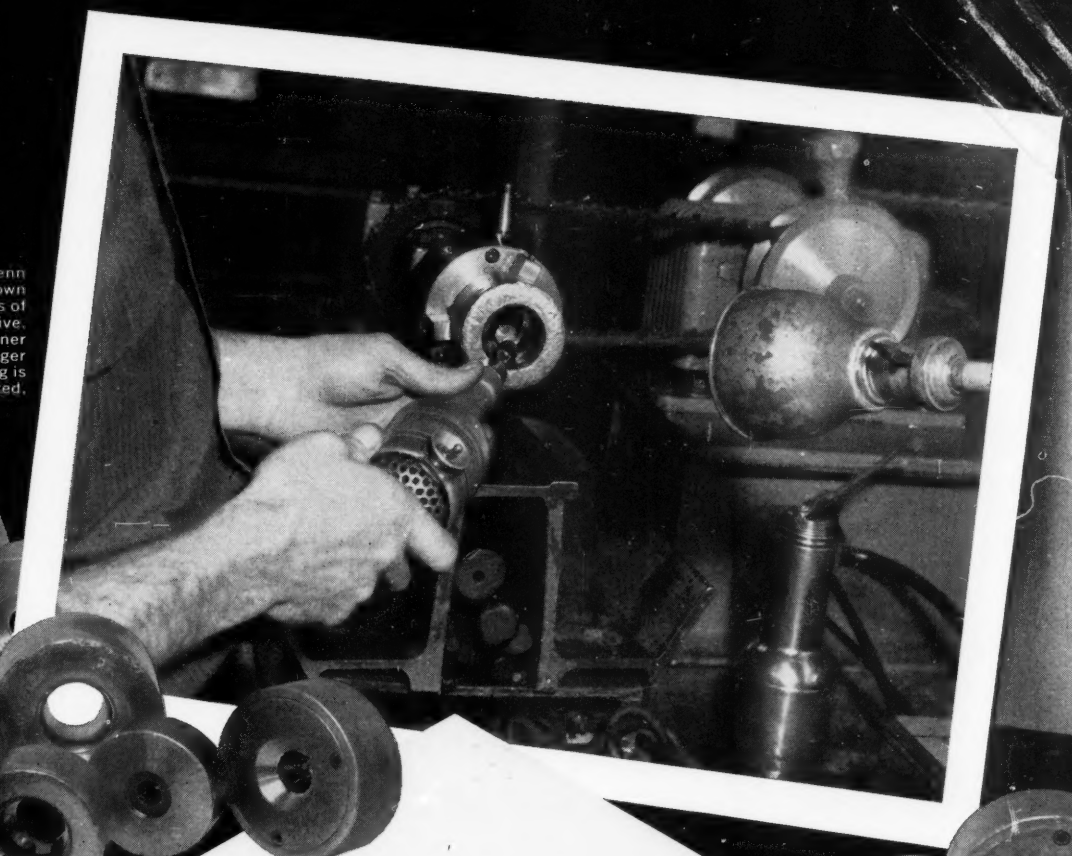

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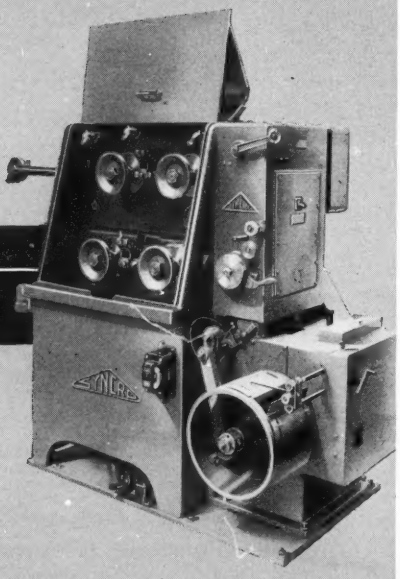

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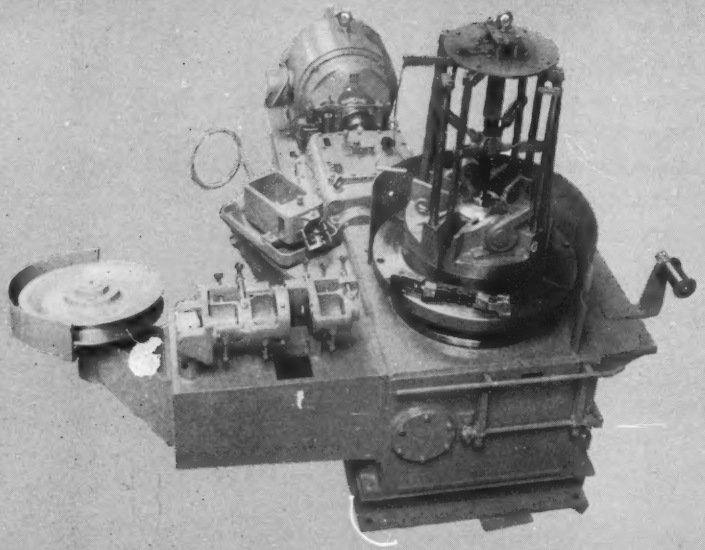

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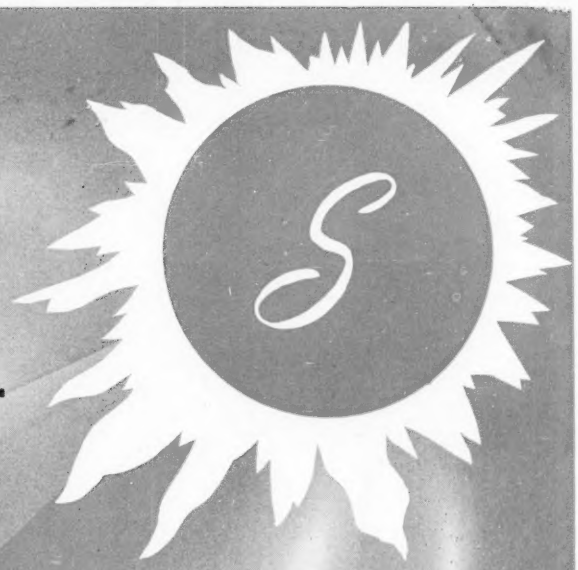

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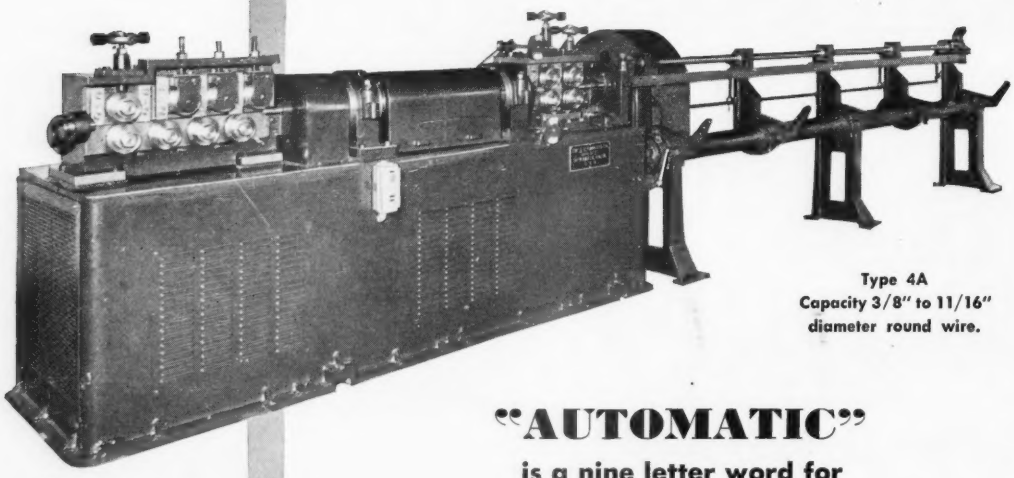

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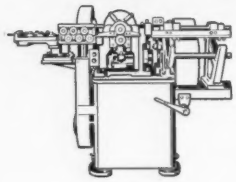

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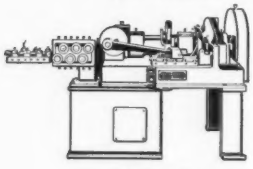

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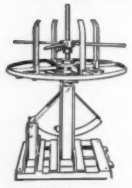

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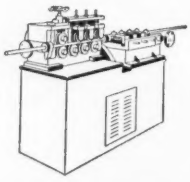
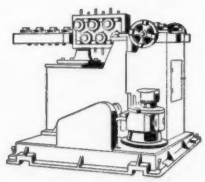


TUBE STRAIGHTENER



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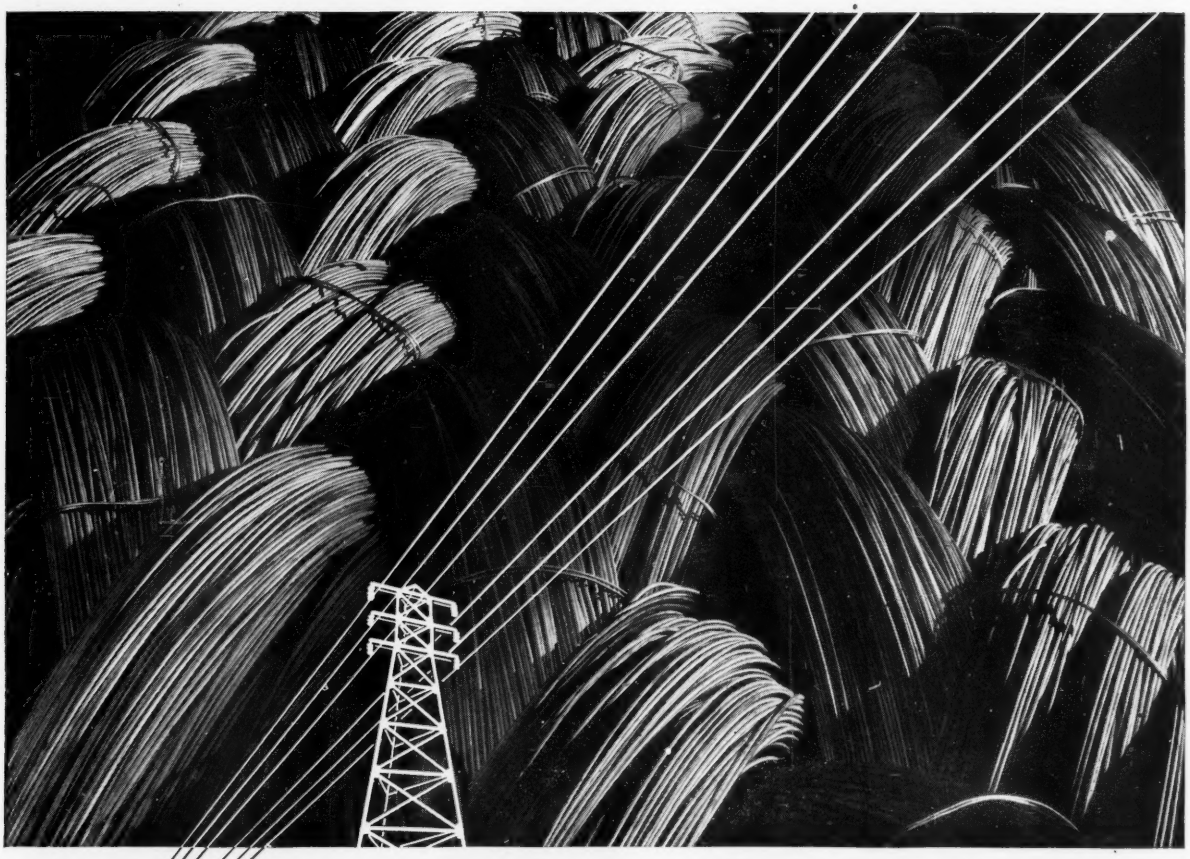

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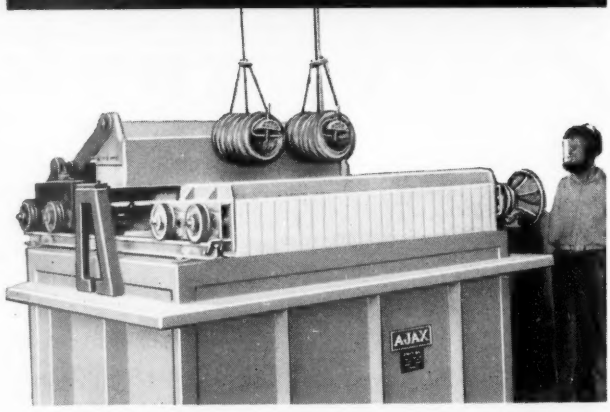

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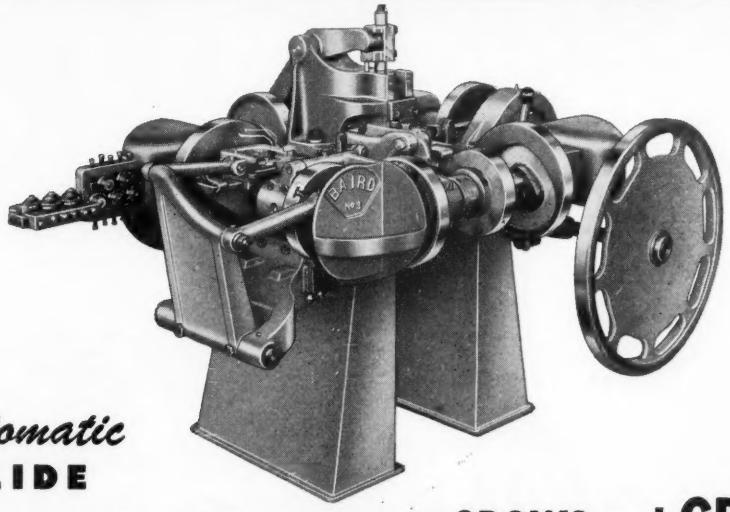


BAIRD *Automatic* FOUR SLIDE

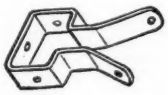
. . . the Machine that GROWS and GROWS and GROWS

Start, if you wish, with the standard (stocked) 4-slide, which in itself is remarkably versatile in forming hundreds of articles from wire and ribbon metal.

Then when conditions demand . . . a call for even greater versatility of production or a change in certain products . . . you may add one or more attachments to the standard model, so designed that "machine growth" is simplified and practical.

Thus, with gradual investments, you will build your Baird 4-slide to a full production unit capable of turning out the widest variety of wire and ribbon products. Here is a list of attachments easily added . . . but naturally, not all on one machine . . . as they might become too complicated.

1 Horizontal Press Attachments



2 Form Raising Attachment

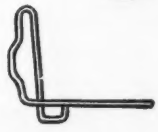
3 Pin Pulling Attachment

4 Round Wire and Ribbon Metal Rings
(Simple, practical tooling available)

5 Secondary Cut-Off Attachment

6 Pinch Pointing — Nail Pointing
(Tooling to suit work and wire specifications)

7 Vertical Forming and Stripping
(New patented Baird mechanism for this work)



Baird engineers will gladly develop tooling from your parts or specification. "Ask Baird about it!"

the BAIRD MACHINE COMPANY
STRATFORD • CONNECTICUT

AUTOMATIC MACHINE TOOLS • AUTOMATIC WIRE & RIBBON METAL FORMING MACHINES • AUTOMATIC PRESSES • TUMBLING BARRELS

4BA52

Specials!

In addition to a complete line of standard wire drawing and bar drawing machines, Ajax designs and manufactures special drawers to meet a wide variety of special requirements. Whether the need is for round, square, hex., keystone or rectangular section stock to close tolerances or whether the drawer is to be used in conjunction with cold headers, presses or special machines, Ajax can build it to meet the requirements and at a cost consistently low for the size and quality of the machine produced. If you have a need for drawing ferrous metals from 1010 to 52100 or non-ferrous metals with enough hardness to permit gripping, which is beyond the range of one of our standard drawers our engineers will be glad to discuss your particular requirement with you. We will be glad to send further information.

A Bar Drawing and Straightening Machine

B Drawing, Straightening and Cutting off Machine

C for Drawing Keystone Stock

D for large Waterbury-Farrel Nut Machine

E for ½" Nut Machine

F for ¼" Hi-Pro Header

G for ⅜" Hi-Pro Header

H for No. 5½ Minister Press

I for Double End Spoke Header

J Continuous Drawing Machine

K for ⅝" Bolt Maker

THE **Ajax** MANUFACTURING COMPANY

EUCLID BRANCH P. O. CLEVELAND 17, OHIO

110 S. DEARBORN ST. CHICAGO 3, ILLINOIS

DEWART BUILDING NEW LONDON, CONN.

THE CURE THAT MAKES A HEALTHY BUSINESS

...Better Production
...Satisfied Customers

Typical Davis-Standard Heavy Duty Continuous Vulcanizing Machine for Hot or Cold Fed Compounds. Built in 3¼", 4½", and 6" Bore Sizes.

Insulated wire that is cured in a Davis-Standard Continuous Vulcanizer has a long and useful life expectancy. Its inherent stamina enables it to win loyal customers and build a healthy business for the wire manufacturer.

Equally important to the manufacturer are the ease, speed, and dependability with which the Davis-Standard Continuous Vulcanizer administers the cure. The machine is easy to set to the precise temperatures and conditions required by today's coatings, and will operate indefinitely in the severest service, without adjustment or shutdown.

For better production and better wire products, write for full information and specifications.

Our engineers welcome the opportunity to work with yours in the solution of any of your extrusion or vulcanizing problems.

EST. 1848

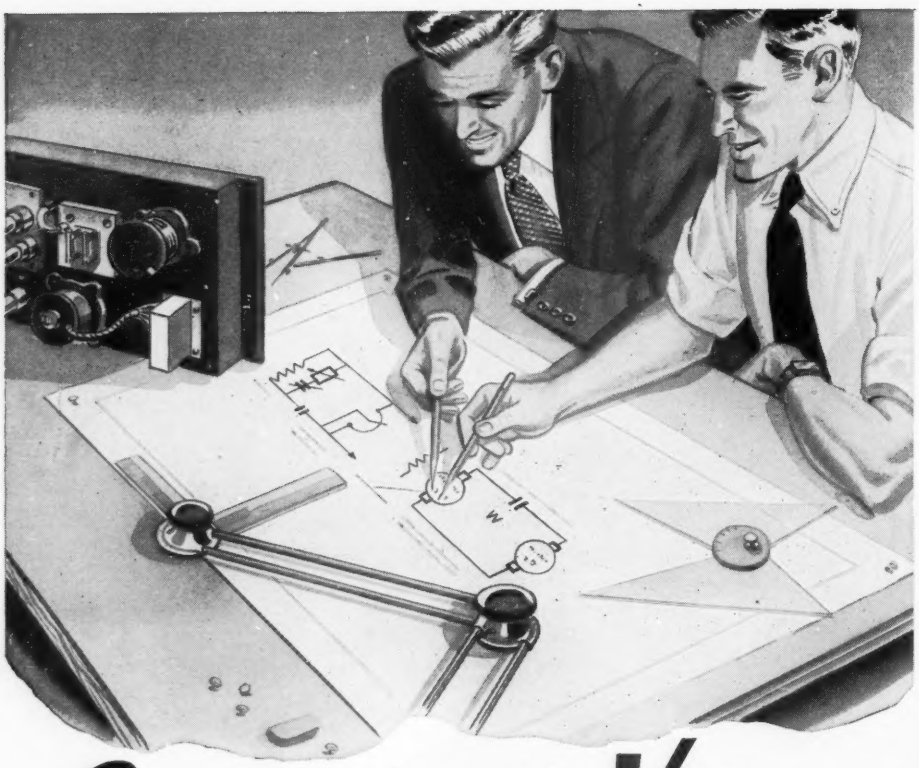
THE STANDARD MACHINERY COMPANY

14 WATER STREET MYSTIC, CONN.

MOLDING PRESSES AND EXTRUSION MACHINES

World's Largest Manufacturers of Custom-Built Extrusion Machines

Export Office: Ballagh & Thrall, Independence Square, Philadelphia 6, Pa.



Design it with Vitron®

TO REDUCE INSULATION FAILURES

More and more plant engineers have learned that protecting equipment with VITRON reduces insulation failures. VITRON Insulating Materials are made to do the job in motors, generators, relays, coils, cables and other electrical apparatus because of their:

HEAT RESISTANCE: withstand temperatures up to 1000° F.—far beyond any known impregnating compound.

LOW SPACE FACTOR: overall strength of VITRON glass fibers plus high insulating value permit use of thinner insulations with safety, substantially reducing the size of many electrical units.

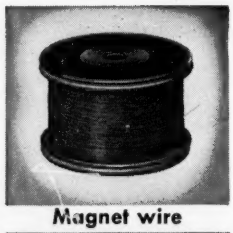
MOISTURE RESISTANCE: VITRON Glass Fibers do not absorb moisture; they do not shrink or swell in dry or humid conditions.

CONSISTENT UNIFORMITY: combining modern electronic heating and extrusion in an exclusive process, Glass Fibers Inc. brings you fibers noted for consistent uniformity and quality.

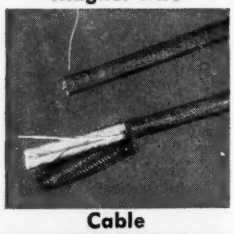
Vitron

ELECTRICAL INSULATING MATERIALS

Leading suppliers can furnish VITRON-based Electrical Insulating Materials in a wide variety, ready to go into your product. Write us about your insulating problem, and our customer service department will tell you where the material you need is readily available. Address 1810 Madison Avenue, Toledo 2, Ohio.

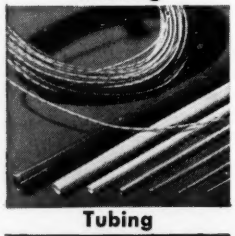


Magnet wire

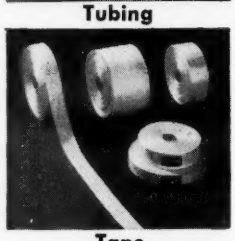


Cable

Sleeving

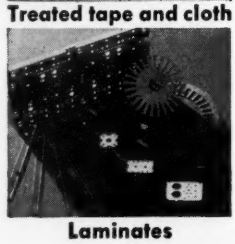


Tubing



Tape

Treated tape and cloth

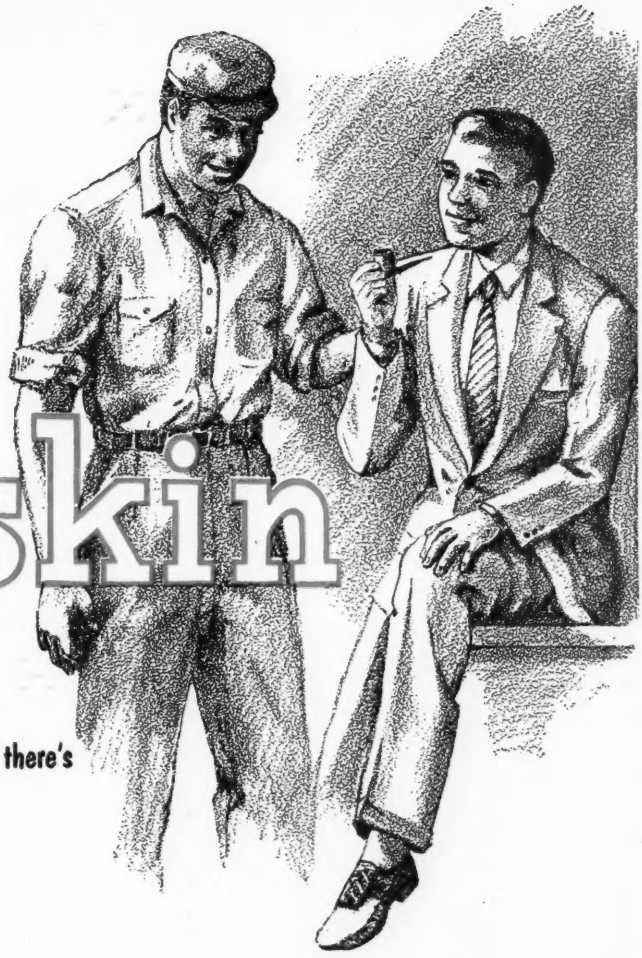


Laminates

GLASS FIBERS INC.

Makers of glass fiber products by the ELECTRONIC-EXTRUSION process, developed, patented and used exclusively by Glass Fibers Inc.

No more Lubricant Trouble—since we started using Steelskin



That's what shop foremen who have tried Steelskin lubricants say! And there's good reason for it!

Constant research, continued testing in the field have contributed to Steelskin's top performance. Users report improved die life; greater uniformity and better quality in the wire products they produce. Shop men like these lubricants because they know they can rely on Steelskin's uniform composition, texture, and consistent quality year after year . . . *plus* the fact that Steelskin's engineers are always ready to assist them with wire drawing problems.

It adds up, doesn't it? Better specify Steelskin Wire Drawing lubricants for *your plant*.

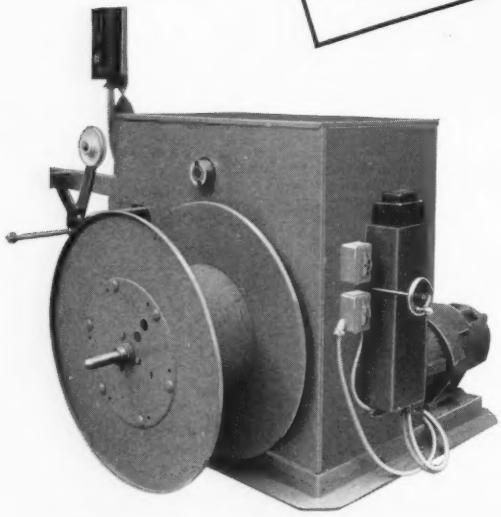
WRITE TODAY for complete information on Steelskin soaps and compounds.

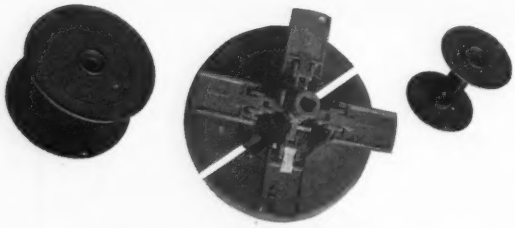
Steelskin LUBRICANTS

R. H. MILLER
Company, Inc., Homer 1, N. Y.

Now!

INTRODUCING THE COMBINATION MACHINE LONG AWAITED BY THE WIRE INDUSTRY —ELECTRONICALLY CONTROLLED—





THE NEW DAVIS REELER AND RE-SPOOLER

is equipped with a Davis predetermined counter for recording production. Stops automatically at any selected footage. A tachometer can also be furnished to indicate speeds.

THE

DAVIS REELER AND RE-SPOOLER

This new combination machine, designed and developed as a result of Davis engineering research, is the last word in efficient and economical production. Of all welded steel construction, the combination is rugged, precision made and vibrationless.

Designed for use with the completely automatic DAVIS SPARK TESTING EQUIPMENT with your tinning or other present equipment. Adapted for use with any type collapsible coiling head up to 30″ diam.

EXCLUSIVE DESIGN FEATURES

1. Top re-spooling shaft is interchangeable to accommodate ⅝″ up to 1½″ diameter shafts—or to your specifications. Reel diameter 2″ to 18″. **Shafts can be interchanged in a matter of seconds.**
2. Lower or take-up shaft is also interchangeable. Sizes are standard—1¼″ or 1½″ diam.—or as you may specify. Reels up to 30″ diameter accommodated on this shaft.
3. Traverse, with variable speed control for all wire sizes, syncronizes with shaft speeds. Traverse width adjustable up to 16″.
4. Constant wire winding speeds over a 10—1 range. Maximum speed, 1200 FPM, but higher speeds available. Speed changes easily made through accessible controls.
5. New ELECTRONIC CONTROLLER starts machine with low torque factor. Avoids stretching and/or breaking of wire.
6. Electric disc brake of 10 to 25 lbs. will be furnished according to your requirements.
7. Safety cap provided for the idler shaft.
8. Constant footage device supplied if desired.

You are invited to get the facts on this remarkable machine

DAVIS EQUIPMENT

DAVIS ELECTRIC CO. WALLINGFORD, CONN., U.S.A.

HARNESS TESTERS • PAY-OFFS • TRAVERSES

SPARK TESTERS • SPOOLERS • TAKE-UPS • CAPSTANS

Pathfinders for your SPECIFIC JOBS

In addition to the three standard Pathfinders which we offer to cover the steel wire industry's normal needs (brief details below) we make machines of this type to fulfil your SPECIFIC requirements.

An interesting example is shown here: it was made to draw very high grade rope wire from patented inlets of .375″ diameter through eight dies, finishing with a light draft to ensure good torsional qualities. The speed range on the last block is 400 to 1200 feet per minute.

THE STANDARD PATHFINDERS	Type 30/60	Type 22/40	Type 22/30
No. of Blocks	5	6	6
Block Diameter	30″	22″	22″
Max. Inlet (High Carbon)...	.500″	.312″	.220″
Approx. finished size range	.250″ — .120″	.144″ — .080″	.120″ — .064″
Finishing speed range at full H.P.	450 — 1100 ft/min.	700 — 1400 ft/min.	800 — 1600 ft/min.

MARSHALL RICHARDS MACHINE CO. INC.

1100 SOUTH BROAD STREET · TRENTON 10 · NEW JERSEY
TELEPHONE: TRENTON 6-9478 . TELEGRAMS: MARICH TRENTON

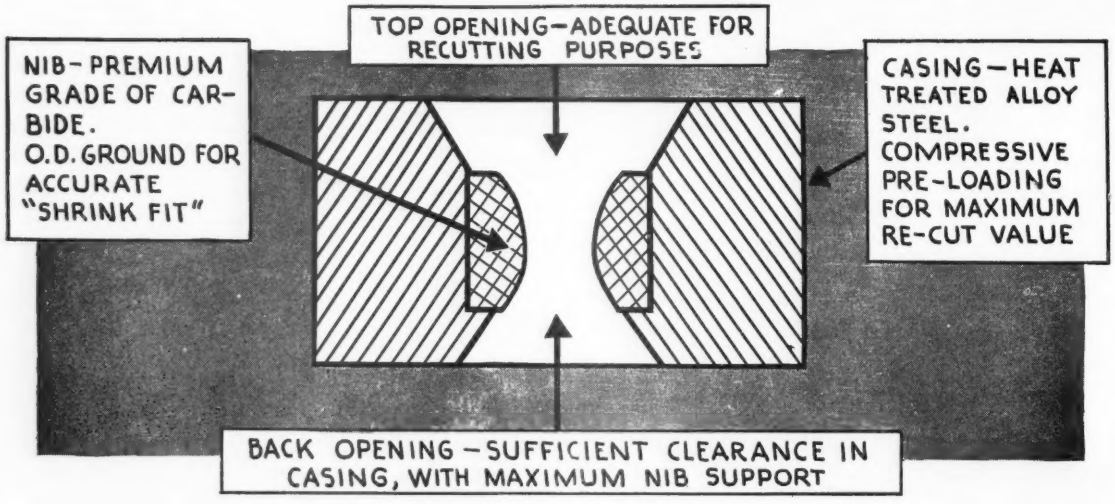
M.R.71

YOU WILL DRAW MORE AND BETTER WIRE

IF YOUR WIRE DRAWING DIES ARE PROPERLY DESIGNED

Special features are designed and built into EASTERN CARBIDE'S DIES that make these dies last longer, produce better wire and give higher poundage per die. Our dies will give you super-performance, save you money and conserve metal.

These dies can be bought semi-finished at the standard price of rough-drilled dies. They require only light sizing and polishing.


TOP OPENING—ADEQUATE FOR RECUTTING PURPOSES
NIB—PREMIUM GRADE OF CARBIDE. O.D. GROUND FOR ACCURATE "SHRINK FIT"
CASING—HEAT TREATED ALLOY STEEL. COMPRESSIVE PRE-LOADING FOR MAXIMUM RE-CUT VALUE
BACK OPENING—SUFFICIENT CLEARANCE IN CASING, WITH MAXIMUM NIB SUPPORT

We also supply a full line of superior carbide tooling for the Cold Heading Industry.

EASTERN CARBIDE CORPORATION

Telephone: New Rochelle 2-6630

55 DRAKE AVE. **NEW ROCHELLE, N. Y.**

Complete Carbide Sales and Service

Whose cheese is being divided?

TWO cats could not agree on fair division of a tasty cheese. "Let's go to the monkey," said one, "He is all-wise and can divide our cheese fairly." So to the monkey they went.

The monkey immediately broke the cheese evenly and judicially put the two pieces on the pans of his balance. But one was slightly heavier. He shrewdly nibbled that piece a bit and put it back on the scales. Now it was the lighter piece. So he bit off some of the other piece only to find it the lighter. Thus while the two hungry cats watched, the monkey kept taking bites of the cheese, first one piece, then the other, until finally the cheese had almost disappeared.

"What's left is too small to divide," sagely pronounced the monkey, as he popped the remaining fragments into his mouth.

Observers of the American scene see a direct parallel between the record of federal taxation and this ancient parable of the trusting cats, the greedy monkey and the cheese. Business and the individual citizen have been content to trust government to rule on the disposition of their earnings. And Uncle Sam keeps taking bite after bite out of the shares of both individual citizen and business.

Already government bites are so large as to severely penalize citizens and business alike. If allowed to continue, it will seriously impede further industrial progress and growth, stifle initiative and threaten the strength of our free enterprise system. Beware the day—goal of the socialists among us—when the monkey says, "What's left is too small to divide."

QUALITY
YOUNGSTOWN
SERVICE

The Youngstown Sheet and Tube Company

General Offices--Youngstown 1, Ohio
Export Offices--500 Fifth Avenue, New York

MANUFACTURERS OF CARBON ALLOY AND YOLOY STEELS

RAILROAD TRACK SPIKES - CONDUIT - HOT AND COLD FINISHED CARBON AND ALLOY BARS - PIPE AND TUBULAR PRODUCTS - WIRE - ELECTROLYTIC TIN PLATE - COKE TIN PLATE - RODS - SHEETS - PLATES.

For copper in any form – For top-notch service – Call Chase

CHASE

What kind of copper or copper alloy do you need? Free-cutting brass rod? Sheet and strip brass? Phosphor bronze for springs? Call your nearby Chase warehouse. We can supply you, subject to government controls, with the widest variety of brass or copper materials for production, maintenance or repair.

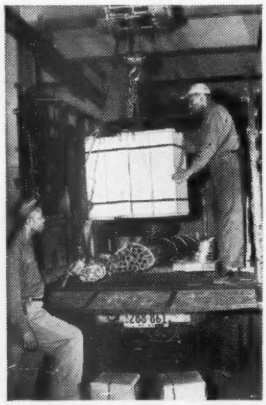
Many of our branches are equipped to slit, saw, or shear our metals or your own stocks to specifications.

Chase® BRASS & COPPER

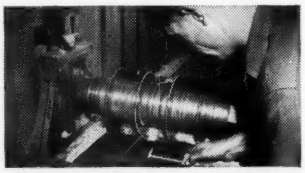
WATERBURY 20, CONNECTICUT • SUBSIDIARY OF KENNECOTT COPPER CORPORATION

• *The Nation's Headquarters for Brass & Copper*

Albany†	Cincinnati	Houston†	Minneapolis	Pittsburgh	Seattle
Atlanta	Cleveland	Indianapolis	Newark	Providence	Waterbury
Baltimore	Dallas	Kansas City, Mo.	New Orleans	Rochester†	
Boston	Denver†	Los Angeles	New York	St. Louis	(†sales office
Chicago	Detroit	Milwaukee	Philadelphia	San Francisco	only)



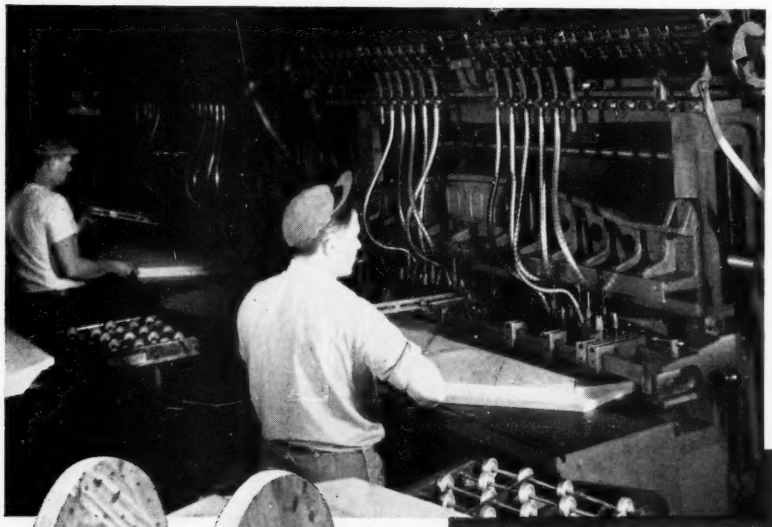
Deliveries to your factory by truck, rail or express, if desired.



Close tolerance sawing, slitting, shearing to your specifications.

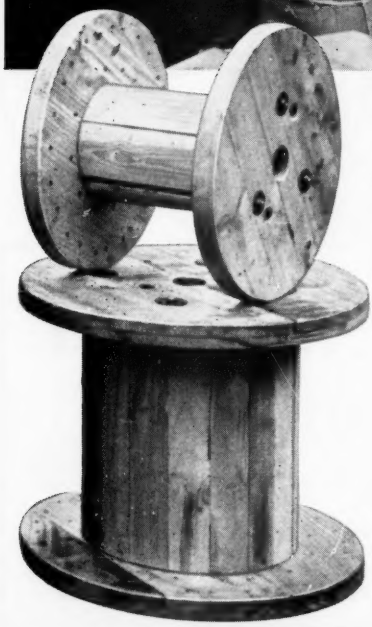
Stocks of tube, rod, bar, strip, sheet and wire in a variety of alloys.

EFFICIENT, STREAMLINED PRODUCTION METHODS RESULT IN THE BEST POSSIBLE



WOOD REELS for CABLE • ROPE • WIRE

12" to 96" in diameter.
Knocked down or assembled.
Returnable or non-returnable.
Reel heads for steel drums.
(Left: Automatic Nailing Machine)



BRIDGE PLANNING GETS ORDERS FILLED PROMPTLY

These production methods, plus Bridge's unique distribution service — truck and fast rail facilities — provide wood reel users with a combination of finely made reels and a good delivery service. Special equipment both for materials handling and manufacture make for volume production with a minimum loss of production time.

Low in cost, too, because of the exceptionally efficient straight-line production methods.

PLUS A SPEEDY SHIPPING SERVICE

Bridge delivers by truck to your door within a radius of 200 miles from the plant. Fast freight will bring you Bridge reels in 5 days or less east of the Mississippi.

BRIDGE
MANUFACTURING CO.
HAZARDVILLE, CONN.
Phone Thompsonville, 3375

Let us quote on your reel needs. Send your specifications. Better yet, visit our plant and see how and why our reels are made so well at so low a cost.

SAVE TIME...SAVE MONEY

Take Advantage of

*CONTINENTAL WIRE SERVICE

Stop struggling with production problems caused by using wire not right for the job. Let Continental help you. It's easier—quicker to profit from our years of experience. Continental makes wire for more than a thousand uses . . . for almost any need. Get the wire that's right for each job. Take advantage of this helpful wire service by calling Continental at Kokomo, Indiana today.

*Trade Mark Reg. U. S. Pat. Off.

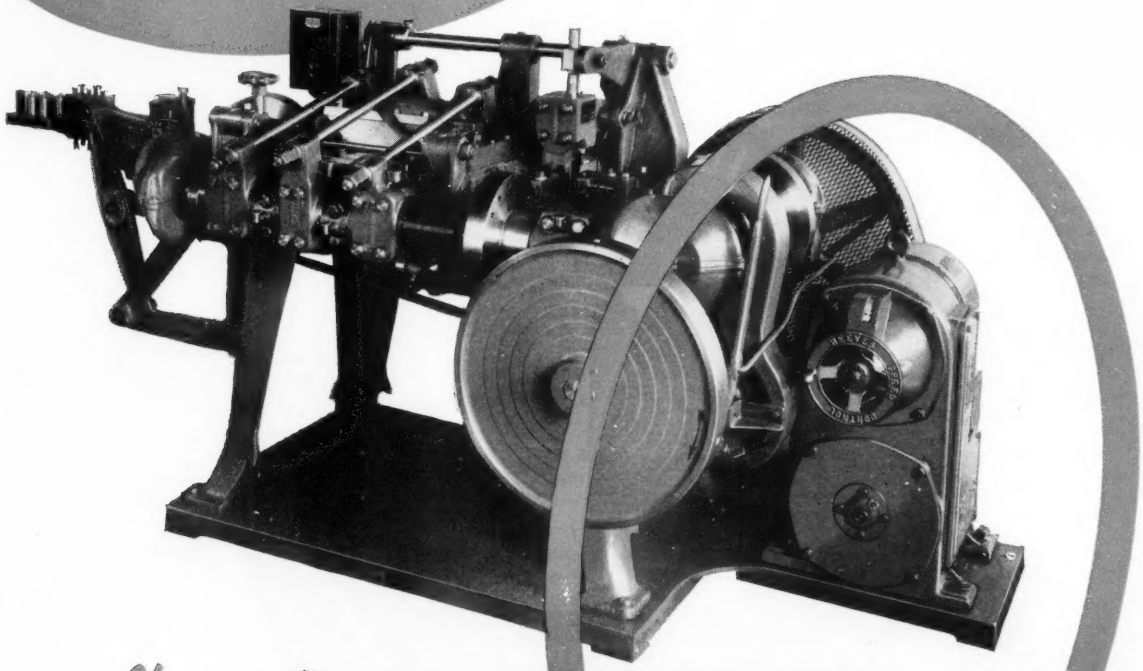
CONTINENTAL STEEL

CONTINENTAL STEEL CORPORATION

GENERAL OFFICES • KOKOMO, INDIANA

RODUCERS OF *Manufacturer's Wire* in many sizes, apes, tempers and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, Lead Coated, and special wire. ALSO, Coated and Uncoated Steel Sheets, Nails, Continental Chain Link Fence, and other products.

A vertical type REEVES Vari-Speed Motodrive (circled) functions here as the independent power unit for the Model S-3-F Nilson combination power press and four-slide forming machine. Taking metal directly from the coil, this one machine can straighten, feed, pierce, emboss, stamp, cut off and form. For this variety of operations, the REEVES Motodrive assures infinite, accurate speed control at all times.

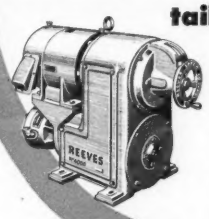


Choose Reeves variable speed drives

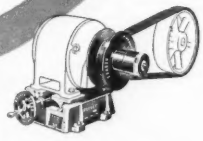
that always deliver the right speed —to deliver top-quality goods!

Wherever the margin for error is narrowest . . . wherever the demand is for accuracy and closest control of temperature, timing or a dozen other production factors . . . that's where you'll find REEVES Variable Speed Drives. That's because REEVES accurately and unfailingly provides the split-hair speed control essential to low-cost production of uniform, top-quality products. For your machines—those in service and the new ones you plan to buy—specify REEVES. It's America's *most complete* and *most used* line of variable speed drives. Send for free catalog, No. WP83-G.

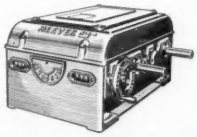
the REEVES line includes a type tailored to every need



VARI-SPEED MOTODRIVE®: A complete variable speed power plant. Combines any standard, constant-speed motor, REEVES speed-changing mechanism and gear reducer in one, compact unit. Sizes to 25 hp; speed ratios as great as 10 to 1.



VARI-SPEED MOTOR PULLEY: Converts any standard, constant-speed motor to a variable speed drive. Speed variations up to 4 to 1. Sizes to 10 hp.



VARIABLE SPEED TRANSMISSION: Provides stepless speed adjustability over a wide range—as high as 16 to 1; sizes to 87 hp. Vertical or horizontal designs—open or enclosed.

REEVES PULLEY COMPANY • COLUMBUS, INDIANA

Recognized leader in the specialized field of variable speed control

accurate • variable

REEVES *Speed Control*

For the FINEST Dies...

Specify

DIES... TOOLS... WEAR PARTS... BLANKS...

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IN CANADA: (TOOLS) CARBIDE TOOL CO. W. Toronto 9, Ont. (DIES) VASCARB TOOL & DIE CO. Hamilton, Ont.

The Wire Outlook

Business trends during the closing months of the past year continued their upward surge, but with signs of leveling off. Many industrial gains were less than seasonal, although holiday retail sales look as though they may make new peaks. Stability, rather than a marked change up or down, is in the air.

Recent surveys and the statements of business observers very generally voice a note of optimism. Inventories are in better shape and more in conformity with operating levels. Employment is high. Materials availability has improved. In the government, we can look forward to a shift from theorists to men of action, from persecution of business to friendliness, from profligacy to economy, from laziness to hard work, from higher taxes to lower, from inflation to steadiness and from a left-wing ideology to conservatism.

Commodity prices are shaky on world markets and at home, credit is tightening, interest rates are up and profit margins are narrowing—all indications of a growing feeling that healthy competition has returned and inflation has at long last been curbed. Unfilled orders guarantee several months of high production that will tide the country over until the new Administration's policies can begin to take effect.

The incoming government, however, will make no drastic moves at present, and it may take long years of earnest and honest devotion to the country's welfare to overcome the cumulative effects of twenty years of wastefulness and inefficiency.

On the foreign front, the war in Korea poses a big question. It is too early to know whether it can be stopped and in what direction a changing policy may lead. At least we can be sure that vacillation and doubt will be removed and a firm, long-range policy substituted that is more than likely to lessen the chance of a broadened war base. Even a truce, however, would not affect our armament program, for in strength lies our only hope of security.

Corresponding with the record rates of steel production, wire rod rolled in a number of mills has reached new highs. Stainless rod and wire output has also jumped. Demand for high carbon specialty wire has increased, with orders for valve spring wire especially good. Weaving wire, textile industry wire, nails, bale ties, fencing and some other merchant products are down in demand, largely a normal seasonal curtailment in orders. Bolt and nut demand, especially for civilian products has risen, with an easing of the supply tension accompanying it, particularly in the lighter gauges. Upholstery spring wire is in better demand. Wire orders from screw producers has increased somewhat.

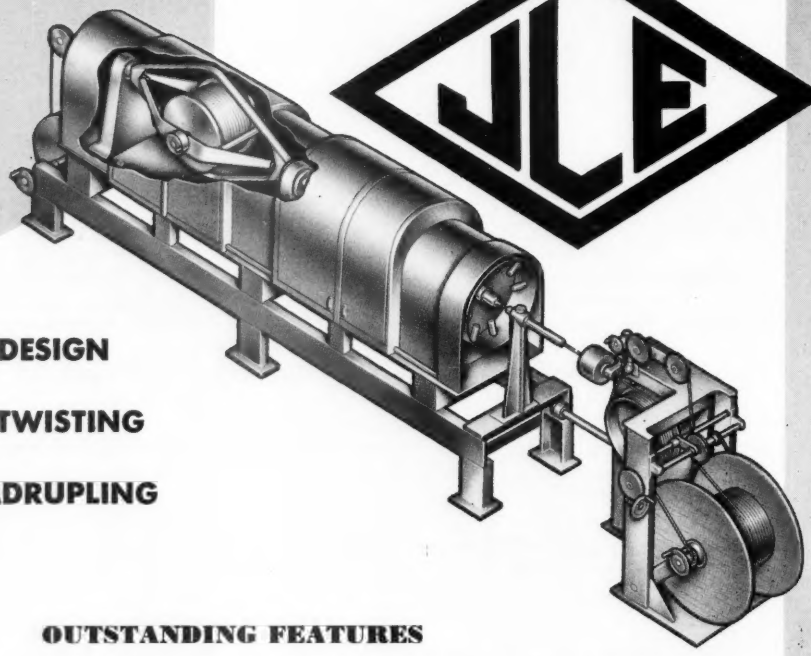
Copper supply has been slowly increasing and in spite of the substitution of aluminum for it in many uses, both the supply and the demand for copper will increase over the years—the DPA estimates that by 1975, there may be a need for 500,000 more tons than at present. In the wire field there are many uses for copper that cannot be economically supplanted by substitutes—copper for most types of electric wire, and for brass, bronze, beryllium and the many copper-base alloy wires.

Aluminum wire will hold its own in the numerous applications it has found and will find. With the new production facilities already started, a future good supply of this metal seems assured.

Despite the improvement in outlook for 1953, we must not lose sight of the fact that miracles are not likely to take place in Washington. It is enough right now to know that capable, high-minded men have started to try to unscramble an inherited mess. It will take time, cooperation, faith and a prodigious amount of hard work. That it will be done, and in orderly manner, we have no doubt.

—from the Editor's Desk

High Speed TWISTER



A NEW JLE DESIGN

FOR HIGH SPEED TWISTING

TRIPLING OR QUADRUPLING

OUTSTANDING FEATURES

- Both ends of the bows are driven, permitting light weight bows with low starting torque and exceptionally high speeds.
- Conductors are carried through the bearings in straight lines, eliminating the usual double bends.
- Compensating Pay-Offs keep wire tension practically uniform.
- A Shaftless Pay-Off and Take-Up allows quick, easy reel changes.

DESCRIPTION

Frame and cradles are of exceptionally durable structural steel. Slide mounted safety interlocking guards prevent operation until they are in position.

Cradle reel brake is controlled by wire tension.

Capstan and Take-Up combined in one compact unit with new guides permitting reel to be very close to Capstan. Variable speed drive Capstan of the flat sheave type with fleeter ring, permitting rapid changes and accurate controls of lay without excessive bending of cable. The cotton flyer is mounted on the Capstan frame.

For further information write for CATALOG SECTION 15A-1

See Page 79 for a complete listing of JLE Products for the Insulated and Bare Wire Industry

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WIRE
AND WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip.
DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING.

Vol. 28 JANUARY, 1953 No. 1

Three Score and Ten Years of Wire Making

by Peter Igoe, Treasurer
Igoe Brothers, Inc.
Newark, New Jersey

THE MORDICA MEMORIAL LECTURE FOR 1952

Ladies and Gentlemen—If it had to be that Mr. Igoe could not deliver this memorial lecture himself, then I feel it a privilege to be of service to him in this way.

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Picture, if you can, a man standing here — about my height — in fact, about my build—but carrying with ease, the weight of 85 years —70 of which have been spent in the wire industry—that would be Peter Igoe, Senior.

★ ★ ★

The following are his words:

My good friends in the Wire Association—I felt highly honored when Major Brown suggested that I deliver this Memorial Lecture. It would be very hard for me to add much, if anything, to what has already been said in different lectures about Jack Mordica. I knew him probably as long, if not longer, than any member of the Association, having worked with him in 1888 and 1889 in New Castle, Pennsylvania. I knew him as Jack Carter then as his widowed mother had married a wire-drawer by the name of Jim Carter. No doubt it was because of Jim's influence that Jack went to work in the wire mill.

★ ★ ★

About this time, there was an epidemic of black diphtheria and three or four of the Carter children died from it. I remember Jack later telling me that whenever he was anywhere near New Castle, he always went to the cemetery to pay his respects to his dead brothers and sisters.

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When he left New Castle, I assume Jack worked in different mills in the Midwest. I know he worked in Anderson, Indiana, as he told me that while there he thought of going into the real estate business. I am quite sure he would have made a success in real estate, yet, I doubt very much if he could have reached the heights that he did in the wire business. Certainly I believe you will agree that it was a very good thing for the wire business in general that he decided to

In this retrospective lecture, prepared for delivery at the Annual Luncheon of The Wire Association in Cleveland, Ohio, on November 12, 1952, Mr. Igoe has sketched for the present generation the growth and improvements that have occurred over a span of years—ordinarily a lifetime—in the uses and processing of wire as he has observed it.

Mr. Igoe was born in Belleville, New Jersey, on October 20, 1867, and began his wire career at the age of fifteen with the Hartman Steel Company, Beaver Falls, Penna., in February, 1883. In this job he worked five nights a week, twelve hours each night, weighing wire for the wire drawers, one of whom was James A. Farrell, who later became president of the giant United States Steel Company. All through the subsequent years he and Mr. Farrell maintained a friendly contact with one another.

From Hartman he went with the Salem Wire Nail Company, Salem, Ohio and later became associated with the New Castle Wire Nail Company at New Castle, Penna. In 1895 he and two brothers started their own wire business in Brooklyn, N. Y., which has been in continuous operation for the past fifty-seven years, with plants in Brooklyn and Newark, N. J.

Mr. Igoe, because of illness, was unable to be present at the Convention. His lecture was ably and interestingly presented by Charles H. Schiller, Manager, Commercial Research Division, American Steel and Wire Division, United States Steel Company, who had collaborated with Mr. Igoe in securing data and illustrations for it.

IN MEMORIAM

JOHN MORDICA
1873-1937

stay with it.

★ ★ ★

To me there are three outstanding men who were wire-drawers and who drew wire when it was very hard work.

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None of them had the advantage of a formal education, but by hard work **they** reached practically the top in their field. I feel very proud. indeed, to have worked with two of these men, and I refer to Mr. James A. Farrell who was a wire-drawer of the old school and with whom I worked in 1883 and 1884, and Jack Mordica, with whom I worked in 1889. The third I did not have the good fortune to work with, but I did work, believe it or not, with his grandfather, his father, and four of his uncles. He is still with us—we all love him, and hope he will be with us for a good many years; I refer to our mutual and very good friend, Clem McGowan.

★ ★ ★

I, myself, entered the wire business in 1883, starting as a weigher at a new mill in Beaver Falls, Pennsylvania. The mill was first known as the Beaver Wire Company, and afterwards was changed to the Hartman Steel Co. They were building a rod mill as well as a wire mill and used foreign rods until the mill was ready to run.

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There were no self-contained mills in those days. It seems to me that pig iron was made in one place, shipped to the steel mills, made into steel billets, shipped to rod mills, and rods were then shipped to wire mills, made into wire and shipped out West to be formed into barbed wire. The wire was shipped either annealed or galvanized.

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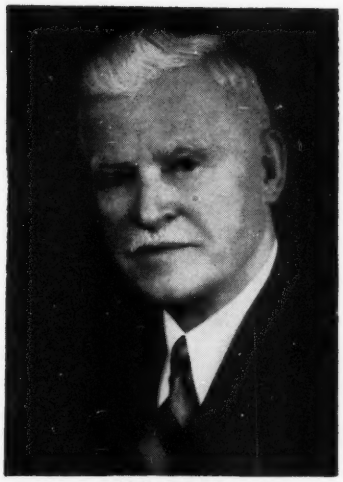
Some of the stockholders in the Beaver Wire Company were also manufacturers of barbed wire in the Midwest and I can recall particularly two names—Jacob Haisch and Isaac Elwood.

★ ★ ★

The wire drawers at that time served an apprenticeship of three years before they became journeymen. They were first given three months training with a wire drawer and the company paid their wages during this period.



PETER IGOE
Mordica Memorial Lecturer for 1952

★ ★ ★

They were then given a set of blocks and, for the first six months the company deducted 35% from their earnings, the next year 30%, and the last eighteen months 20%.

★ ★ ★

While this was a small mill. it did, however, turn out some men that made their mark in different lines later. As I mentioned previously, Jim Farrell was a wire drawer, who afterwards became President of U. S. Steel Corporation. Bill Garrett who was rod-roller in that mill invented the Garrett Rod Mill. Henry Gray, who invented the Gray Mill for Rolling Structural Shapes was roll turner. Tom Midgley invented the Wire Belt and his son—Ethyl Gas. And last, but not least, Frank Baackes who was superintendent of the nail mill, and who, with his brother, Michael, did more than anyone else, I think, to introduce wire nails in this country.

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As I look back over the years that have passed since I set out on my first real job—that of a wire mill weigher—I realize perhaps better than anyone else in this room, the tremendous progress that has taken place—the terrific strides that the Wire Industry has taken in the past 70 years. These strides, of which I speak, might well be called three dimensional, for at one and the same time, three things have taken place.

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First, there has been the amazingly rapid development of the wire industry, the many wire uses which have been discovered, promoted and which have created a demand for more and more wire—more and more kinds of wire. There has been the invention of new machines, new methods of production and new processes.

★ ★ ★

Secondly, there has taken place, practically in my three score and ten years in Wire, a transition from the old guild, or craftsman type of organization—to the highly integrated, mass production industry which we have today.

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The third dimension, which I believe we can measure very clearly, is the great progress that has been made in the benefiting of mankind in general and the workers in the wire industry in particular. I say mankind in general, for whether you realize it or not, today's civilization depends a great deal upon those wires and wire products which many of you in this audience manufacture. And I say our progress has benefited the wire workers in particular, for, as new products, new markets and new manufacturing methods were developed—so were devices which enabled our men to lessen their physical stress, their hours of labor—and, at the same time, improve their standard of living. No longer do men carry coils of rods over their shoulders as a horse wears a collar. Today, cranes, electric hoists and specially designed equipment perform such transportation duties. No longer do men work 11 and 12 hours a day, six days a week.

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The result of man's ingenuity—the machine age—has meant more productivity with less hours of work. It has created time for recreation, time for relaxation which was not the lot of many before the

turn of the century.

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Yes, there are many great contrasts between the wire industry as you know it today and the wire industry as Jack Mordica and I knew it back in New Castle. The intervening years have provided a wonderful experience. You know, a few weeks ago, I had in my office a young man who was quite interested in the Wire Business. He said to me, "Mr. Igoe, if you were to start all over again, would you still choose the Wire Industry in which to make your career?" My answer was immediate and very sincere, "Yes," I said, "for the Wire Industry always contained a challenge, it never lacked for interest; and where else could be found greater diversification?"

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Wire is used for thousands of finished articles—from fish hooks to safety pins, from lampshades to brushes, from loom reeds to belt buckles, from steel wool to door springs. Look about you, can you see or feel a single thing which either does not contain wire or was made without the use of wire? Do you ever get away from it? Certainly not. It's in the alarm clock that awakens you in the morning, it carries your coffee cream from the delivery truck to your door, it helps to produce the clothing you wear, cushions your ride to work, operates your telephone, helps you obtain a good rest at night. Tons of wire hide daily in women's hair, in men's shoes.

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That is the way it is today, but how long has wire been so important? Well, the production of wire is at least 6,000 years old.

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Wire rope and fish netting are believed to have been made some 3,000 years ago. Early wires and wire products were chiefly of copper or bronze, although some iron was produced. Century after century saw improvements in product and in equipment, but here in America, by 1821, our production of wire totaled only 250 tons per year. From that date on new developments came thick and fast. Gilbert wove sieve cloth, John Roebling produced his first rope, the building of railroads created a demand for telegraph wire. Despite the potential demand, however, the production of wire remained very small until after the Civil War. The greatest improvements in both products and processes took place during the latter half of the nineteenth century.

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I will grant you that the Wire Industry is now much larger than it was then and that there have been a few entirely new uses developed—yet, as I look back to those days when Jack Mordica, James Farrell, and I were out in the mill, I realize that it was in those days that the birth of the Wire Industry, as we know it today, took place. By the turn of the century, the Wire Industry had grown to manhood.

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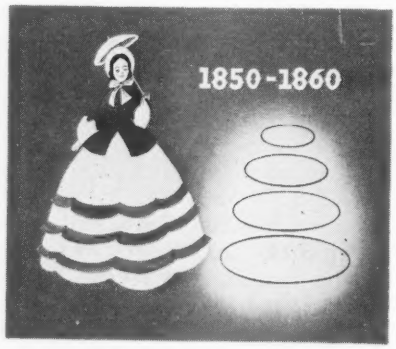
It is difficult to say just what it was that touched off the rapid growth of this industry, but I believe that one important product was the result of the whims and foibles of the fair sex—hoops for the crinoline skirts of the days of the minuet were a big factor.



Mr. Crapo, in his Mordica Address some years ago, stated that barbed wire gave the first boom to the wire business in this country. Possibly he was correct, but listen to an advertisement of the Wallace Barnes Company published in the 75th Anniversary Edition of the Iron Age of November 20th, 1930.

★ ★ ★

"Hoops for Milady's gown," 1857-1860 "The Hoop Skirt," an edict of Dame Fashion and a wagonload of traded-in crinoline wire were the instruments in the founding of a great business, The Wallace Barnes Co., Bristol, Connecticut.

★ ★ ★

This fashion spread over the country like wildfire and soon the Barnes family were running three shifts, 24 hours daily. The hoops were packed in barrels and shipped each day via canal from Plainville, Connecticut, to New Haven, Connecticut, and by schooner or stage coach to New York, where a branch factory employing 200 girls finished the skirts for the retail market.

The output of hoops was much larger than the New York Branch could use and the major portion of each shipment was sold to other concerns. The demand being much greater than the supply, a mad rush ensued, as each shipment arrived.

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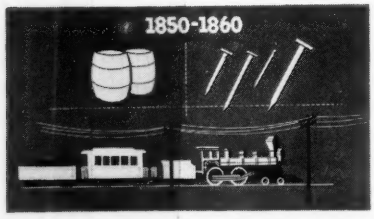
Now hoops were fine for the hoop maker, but they presented their problems as well. As you can see by this picture, there was no sitting on the sofa with a young lady like this. Also, can you imagine the problem of getting all this into a hansom cab for the trip to the opera? However, hoop skirts went out of style in the 1870s, but I believe they created the first boom to the wire business in this country.

In the early 1850s, Morton and Bremner of New York built a nail machine which was used for the next fifty-two years. The machine is still in existence as a museum piece. This machine was designed by William Hassall, who afterwards bought out the Morton and Bremner factory and continued making nails. The concern is still in existence, over one hundred years old, and is known as John Hassall, Inc. of Brooklyn, who make the smallest and finest nails and rivets out of any material from platinum to Norway iron.



Another development was the demand for telegraph wire to accompany the building of the railroads, which were then expanding all over the country. Some of this wire was galvanized, but much was painted or boiled in oil to prevent rusting.

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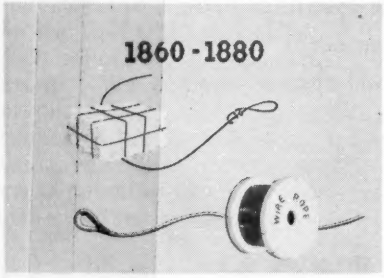
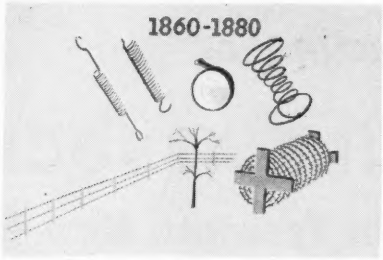
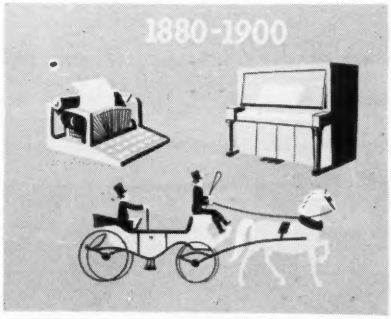
The next two decades actually thundered with the development of new products and with the invention of new machines and processes. In 1860 continuous hot-dip galvanizing was developed, the wire bale tie industry was established. Although John Roebling had already made wire rope, it was in this period that production really got underway.



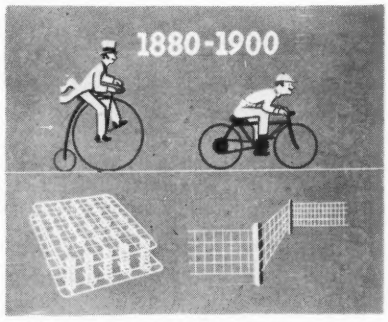
In the 1870's, Morgan developed a process for the oil tempering of wire for springs—square umbrella wire was produced for the first time—and Joseph Glidden secured his patents on barbed wire.—Morgan developed his continuous mill and the use of diamond dies was begun.



The years 1880 to 1900 were engulfed in a flood of new uses for wire. The typewriter was invented, James Midgley succeeded in patenting music wire. Piano wire and piano springs were made. Also, this was the great day of the carriage. Harness hardware and carriage fittings demanded their share of the wire production.



Along came the bicycle, taking vast amounts of spoke wire. Bed springs, as well as furniture springs, were being produced in many areas.



Page produced the first machine-made fence. It was also during this period that the production of wire nails, for the first time, exceeded that of cut nails. And, by 1888, forty-four factories operated over 2,000 barbed wire machines. Nails and barbed wire were then using over 400,000 tons of wire per year.

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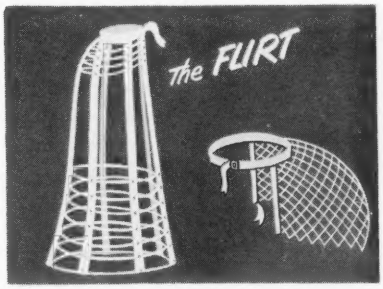
Now, lest we slight the ladies, let's give them some credit here as well. There was that wire used in ladies' bustles, a universal embellishment of the feminine form.



There was the flat wire for those God-awful corset contraptions which gave the Lillian Russells of that era those wasp-like waistlines.

In fact, a fellow by the name of Schilling, in Detroit, produced a corset with a two-way stretch, using small wire springs on the side—and for $3.00 you would buy a very special job in which the corset stays were magnetized—thus—so the promoters claimed, women could automatically treat—electrically—their muscles and tissues and cure many bodily ailments.

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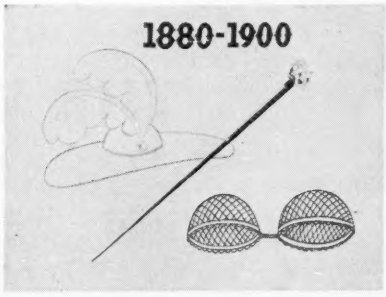
There were those long and deadly hat pins that the ladies used with their Gainsboro hats. Why, they even used wire "bust improvers," the granddaddies of today's bras and falsies. Note that the "improvers" were of the strapless

(*Please turn to page* 112)



A Regional Meeting of

THE WIRE ASSOCIATION

will be held in Trenton, New Jersey at the Stacy-Trent Hotel, April 16-17, 1953

The program will include ferrous and non-ferrous technical papers, a banquet and three plant inspection trips to John A. Roebling's Sons Company's wire mills in Roebling, N. J., to the new U. S. Steel Company steel plant at Morrisville, Pa., and to the Crescent Insulated Wire and Cable Company's plant in Trenton, N. J.

Your Program Committee is

Chairman
LEROY D. SEYMOUR, President
Marshall-Richards Machine Co., Inc.
Trenton, N. J.

Co-Chairman
R. H. SAVIERS, Works Metallurgist,
American Steel and Wire, Div., U. S.
Steel Co., Trenton, N. J.

Co-Chairman
RAY S. WORTH, Mfg. Mgr.,
Wire Mills Div., John A. Roebling's
Sons Co., Roebling, N. J.

This meeting is going to be an excellent one for all wire men to attend and we hope you will make your plans now. Reservation cards will be sent to all members in February. A detailed program will appear here next month.

THE WIRE ASSOCIATION

RICHARD E. BROWN, Executive Secretary

453 MAIN STREET **STAMFORD, CONN.**

Another Avenue to Productivity

by Harvey B. Jordan, President
American Steel and Wire Division
United States Steel Company
Cleveland, Ohio

Mr. Jordan gave this inspiring talk at the Annual Luncheon of The Wire Association in Cleveland, Ohio, on November 12, 1952, during the Convention.

His address is not alone worth reading but of re-reading, as he expressed thoughts that may have a most profound effect on the future of American private enterprise.

Although you were welcomed to this convention on Monday by your able Vice President, Mr. Crewe, may I welcome you again to Cleveland as a wire-using city known throughout the land for its wire products . . . notably in the field of bolts, nuts, screws, welding wire, and many other types of fasteners and manufactured parts. We are happy and proud to have in Cleveland you—the members of The Wire Association.

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You are an organization which has left its mark in the metal fibers that bind our nation together. It can be honestly said there is hardly a project which has not benefited in some way by the activities of The Wire Association.

★ ★ ★

And, this is good for the Wire Industry. I know you all are aware, that while we compete with each other, we also compete as a group. We compete with other products—with plastics and with rubber—with producers in other lands, with mass ignorance of the great potential of the products we make, and with socialistic planners.

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Perhaps a story I heard the other day about a Midwestern farmer will illustrate this point. It seems each year at the State Fair he won blue ribbons for his prize corn.

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One day after he received another award a reporter in interviewing him discovered that the farmer had made it a regular practice to share his best seed corn with his neighbors.

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"Why do you do that?", the reporter asked. "Your neighbors all enter their corn in competition with you."

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The farmer explained, "Don't you know that the wind picks up the pollen from ripening corn and blows it from field to field? If my neighbors grew inferior corn, cross-pollination steadiy will degrade the quality of my own. If I would grow good corn, I must help my neighbors to grow good corn, too."

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It suffices to say that the better we can make our products as a group the better we can compete for the world's consumer dollar.

★ ★ ★

In the next few minutes I will discuss with you a point of view which each day is being highlighted with greater intensity. I am sure you have been aware of it—and I am equally certain you're going to hear much more about it in the months ahead.

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Basically, the idea is very simple. It holds that, while great progress has been made in increasing our productivity through technical development, the total human productivity can be substantially enhanced through the further development and understanding of the attitudes of people toward their jobs.

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It has been pointed out that since the end of World War II the American Steel Industry has been engaged in a vast program of expansion which has added an average of 2½ million tons each year to its ingot capacity. Yet during the same period it has lost about 7 million tons of ingot production each year as a result of strikes. This means for every ton of capacity we have added we have lost nearly three tons of production due to strikes.

★ ★ ★

To take full advantage of the great technical progress we have made in this nation, we need to further refine and to expand some of the great American virtues we already are practicing.

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Perhaps we could appreciate these virtues and practice them much more diligently if we could but see ourselves as others see us.

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As a matter of fact, there are a number of people who have taken a look at us from the outside and who have drawn some conclusions about us. And, those conclusions are great compliments to American industry.

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I am speaking of the more than 200 "Productivity Teams" from Europe who have been touring our American industries as part of the Marshall Plan. Perhaps a number of you here have had personal experience in meeting with some of these Productivity Teams in your own companies.

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I was particularly impressed with some of the things they liked about the United States.

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For instance, almost every one of them reports that it is our American management team that makes the wheels go 'round; in contrast to Europe where an absentee holder, such as a wealthy family or a banker, finances the business and runs it from some remote point without too much concern with its management problems. American industry is run by men who know the business from the ground up; who consider it their main interest in life; and who have their job because of their competence.

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It strikes me as significant that this should be the foremost observation of the outsider. It doesn't surprise me though. We believe in our managements.

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I firmly believe a good management team with an inferior mill can surpass in competition a well-equipped plant, with an inferior management team.

★ ★ ★

Also very noteworthy, is that some of the European labor leaders on these visiting teams pointed out they were convinced it is efficient management that set the pace for productivity in our industry. They observed that American trade union officials could rely on management to be sufficiently progressive, and they were overawed by the confidence of American workers in management's competence, fairness, and integrity.

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It is highly important that we in management continue to cherish this confidence; that we continue to explore and continue to take critical account of ourselves to make sure that our integrity is untarnished and that we retain the human trait of fairness.

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Another observation our friends from overseas have made about us is they find we look upon profits not as the sole end of productivity, but also, as the reward for the social benefits that it brings . . . including such things as higher wages, cheaper prices, and more goods for the consumer.

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This contrast seems so vivid to them because in their countries one increases productivity merely to create profit; and, this is understandable when capital is not linked to the consumer or to the employee by a management which is conscious of human relations such as we have in this country.

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Our visiting friends are amazed to find that it is taken for granted in labor negotiations that an increase in productivity justifies an increase in wages; and that management's remuneration takes into account performance, efficiency and productivity, rather than profit figures alone.

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It is because increased productivity is considered a social and a moral responsibility in this country that both industry and labor believe in and accept technological change rather than resist it,—that is comparatively speaking.

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One of the sharpest observations that these overseas visitors have made is that American industry believes in the importance of the human being.

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They point to such programs as industrial training, management development, and the opportunity for workers to rise to the top as major factors in America's capacity to produce.

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Particularly, they are impressed by the informality which is obtained in our labor-management relationship.

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What it all adds up to in the minds of our foreign visitors is that this country avails itself of a much larger percentage of its human resources than is the case in their own factories.

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I'd like to emphasize that the observations we have been talking about here are concerned with attitudes, principles, and policies; rather than with techniques, machines, and profits.

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Boiled down to a few words, if we should take a good, long look at ourselves, the thing that distinguishes us from the rest of the world—productivity-wise—is that our great technical progress is lubricated with the milk of human relations.

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And, it is in this direction that I am confident management is going to find an effective avenue toward an ever greater productivity.

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I know, when I talk about human relations to you, that there comes to your mind the host of federal, state, and local regulations that govern your every move, your every word, your every decision in carrying on the job of production today.

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In addition, there are the enveloping mandates and prohibitions of the labor contract under which most of us presently operate.

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You rightly ask, in the light of all these inhibiting regulations, how can human relations be made to work on a man-to-man basis.

★ ★ ★

(*Please turn to page* 100)

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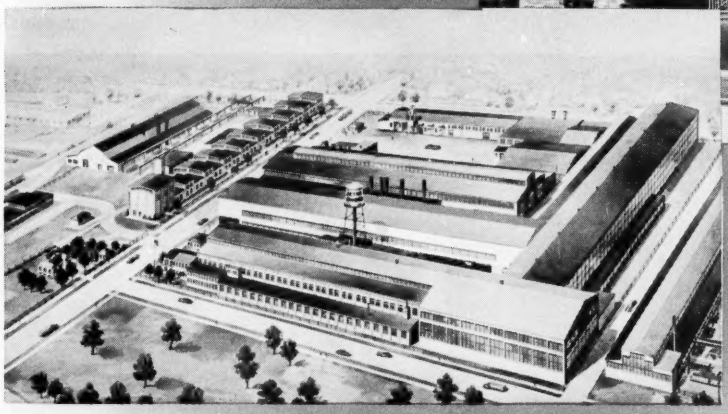

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The Annual Convention of The Wire Association at Cleveland

by Edmund D. Sickels, Editor
Wire and Wire Products
Stamford, Connecticut

It is hard to believe that each Convention can exceed in size and excellence the achievements of a preceding year—but thus it turned out in 1952 at Cleveland, Ohio, at our Annual Convention held from November 10th through the 13th at the Carter Hotel.

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The first day started auspiciously, with over 350 person registering. Total registration for the entire Convention totaled 622, topping last year's attendance by a comfortable margin.

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Technical papers and other program features were arranged for by Leonard C. Crewe, Jr., President of the Maryland Fine and Specialty Wire Co., Cockeysville, Md., General Chairman of the Program Committee, with Walter B. McShane of the American Steel and Wire Division, United States Steel Company, Cleveland, Ohio, as Vice Chairman. Robert C. Peterson, Production Manager, Thompson Wire Co., Worcester, Mass., headed the Ferrous Division Program Committee, whose members were as follows: Joseph R. Carter, Vice Pres. & Genl. Mgr., Johnson Steel & Wire Company, Worcester Mass.; E. Jefferson Crum, Technical Consultant, R. H. Miller Co., Homer, N. Y.; William E. Hitchcock, Jr., Vice Pres., Atlantic Wire Co., Branford, Conn.; Uno V. Johnson, Superintendent, Portsmouth Steel Division, Detroit Steel Corp., Portsmouth, Ohio; and D. M. Schmid, Vice Pres., Alloy Metal Wire Co., Prospect Park, Pa.

Leonard C. Crewe, Jr.
President, The Wire Association

Leslie C. Whitney, Chief Metallurgist of the Copperweld Steel Corp., Glassport, Pa., was Chairman of the Non-Ferrous Division's Program Committee, ably assisted by the following committeemen: Howard H. Allen, Pres., Nonotuck Manufacturing Co., Holyoke, Mass.; Willard deC. Crater, Asst. Mgr., Vinyl Sales, Naugatuck Chemical Division, U. S. Rubber Co., Naugatuck, Conn.; James E. Flood, Chief Chemist, Plastic Wire and Cable Corp., Jewett City, Conn.; C. E. Jackson, Chf. Chem., Paranite Wire & Cable Div., Essex Wire Corp., Marion, Ind.; and William L. Wells, Asst. Supt., Rod Mill, Scovill Manufacturing Company, Waterbury, Conn.

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General activities were handled by Richard E. Brown, Executive Secretary of The Wire Association, Stamford, Conn., with Mrs. Ruth S. Spengel, Assistant Executive Secretary, taking charge of registration, hotel arrangements, luncheon and dinner menus and so forth, and with Eber J. Hubbard, President of the Hubbard Spool Company, Garrett, Ind., in charge of securing and directing the show staged at The Stag Smoker-Dinner on Wednesday evening.

The Directors Meeting and Luncheon

The Board of Directors convened for their annual meeting at 10:30 A.M. on Monday, November 10th, following which they entertained the program committees and program participants at an excellent luncheon in the English Room. Approximately sixty persons attended the affair, which was presided over by Leonard C. Crewe as President of The Wire Association. The outstanding feature of the luncheon was an informal, but delightful and gracious address by our guest of honor, Mr. P. Thirkell Cox, Director of the British Steel Wire Industries Association of Manchester, England, who had come to this country to wind the clock presented to The Wire Association by its British members in 1948. Mr. Cox had performed this ceremony on November 7th, before leaving for Cleveland. Among other things, Mr. Cox expressed his pleasure at the very evident satisfaction of everyone with the outcome of our national elections. He said that he had been much impressed with

the enthusiastic and friendly spirit apparent in our meetings and that he and many others in England would be gratified to see a counterpart of the American Association established in England.

The Technical Sessions

As has proven so successful in the last four years, simultaneous technical sessions were held for both the Ferrous and Non-Ferrous Divisions of The Association during this Convention, except on Monday afternoon, when the Convention formally got under way with a joint session. Following an address of welcome by President Crewe, two papers were presented, under the chairmanship of E. Jefferson Crum. These were a paper, "Manufacture of Copper-Steel Wire by Electrolytic Process" by A. M. Gray, Assistant Superintendent of Development Engineering, Western Electric Company, Baltimore, Maryland, and another by Paul V. Crooks, Works Industrial Engineer, Newburgh Works, American Steel and Wire Div., U. S. Steel Co., Cleveland, Ohio, entitled: "Methods Improvement Study." Both papers were well-received and resulted in spirited discussions.

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On Tuesday morning, November 11th, the Ferrous Division held a session presided over by Uno V. Johnson. Papers were as follows: "Lime for Wire Drawing" by Jere Heisler, Asst. Gen. Foreman, Wire Drawing, Bethlehem Steel Company, Sparrows Point, Md.; "ACSR Wire" by Frank Weise, Jr., Asst. Supt., Rods & Wire, Portsmouth Steel Div., Detroit Steel Corp., Portsmouth, Ohio; and "Selection and Processing of Chromium-Nickel Stainless Steels for Magnetic Applications," by F. K. Bloom & J. S. White, Metallurgists, Rustless Div., Armco Steel Corp., Baltimore, Md.

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At the same time the Non-Ferrous Division held a session under the chairmanship of Willard de Camp Crater with papers, "Glass Paper as an Electrical Insulating Material" by Kenneth J. Busse, Sales Manager, Micro-Fiber Division, Glass Fibers, Inc., Toledo, Ohio; "The Development of Improved Electrical Wiring Materials" by Vincent McBride, Chief Engineer, Plastic Wire and Cable Corp., Jewett City, Conn.; and "Development of New Asbestos Insulated Magnet Wires" by Robert D. Peck, District Engineer, Industrial Products Div., Johns-Manville Sales Corp., Boston, Mass. and Edward B. Hall, Metallurgist, Kennicott Wire and Cable Co., Phillipsdale, R. I.

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In the afternoon of the 11th, the Ferrous Division had three papers scheduled: "The Drawing of Weaving Wire" by Albert Knapp, V. P. & Chf. Eng., G. F. Wright Steel & Wire Co., Worcester, Mass.; "Can Quality Control Be Used in the Wire Mill?"; by H. H. Passolt, Metallurgist, Johnson Steel and Wire Co., Worcester, Mass.; and "Significance of The Elongation Test on Wire" by H. J. Godfrey, Asst. Chief Eng., Research and Development, John A. Roebling's Sons Co., Trenton, N. J. Joseph C. Carter, Vice President and General Manager of the Johnson Steel and Wire Company presided at this session. Mr. Knapp's paper was not read, due to his illness and, therefore, inability to be present in person.

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In the Non-Ferrous Division the program was chaired by James E. Flood, who introduced the following speakers and papers: "Dry Blending for the Vinyl Extrusion Industry" by M. G. Caine, Asst. Sales Mgr., Plastics Division, Monsanto Chemical Co., Springfield, Mass.; "Silicone Rubber: A New Insulating Material for Wire and Cable" by M. G. Noble, Application Eng., Silicone Products Engineering, Chemical Div., General Electric Co., Waterford, N. Y.; and "Weathering Characteristic of Polyvinyl Chloride Type Plastics" by J. G. Hendricks, Director and E. L. White, Asst. Director, High Polymer Laboratory, National Lead Co., Brooklyn, N. Y.

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Wednesday morning, November 12th, the Ferrous Division, under the leadership of William E. Hitchcock, Jr., was given three papers: "Creep and Relaxation of High Strength Steel Wires at Room Temperature" by Gordon T. Spare, Project Eng., American Steel & Wire Div., U. S. Steel Company, Cleveland, Ohio; "Salt vs. Atmospheric Annealing" by E. S. Tyler, Metallurgist, Atlantic Wire Co., Brandford, Conn.; and "Design of a Gas Fired Galvanizing Furnace" by William D. Bawden, Works Mgr., Gilbert and Bennett Mfg. Co., Georgetown, Conn.

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Simultaneously, the Non-Ferrous Division wound up its technical session, with William L. Wells in the chair. The papers presented were: "Effect of Certain Impurities on Free Cutting Brass" by Grayson B. Wood, Jr., Metallurgist, Scovill Manufacturing Co., Waterbury, Conn.; "Cost Reduction Through Improved Plant Layout" by D. M. Schmid, Vice Pres. & Genl. Mgr., Alloy Metal Wire Co., Prospect Park, Pa.; and "Control of Wet Wire Drawing Solutions for Copper" by Dr. Robert C. Williams, Director of Research, The Ironsides Company, Columbus, Ohio. Interesting discussions followed all presentations, which were recorded and which will be published in the January, 1953, issue of Wire and Wire Products.

The Annual Luncheon

Our colorful annual luncheon, brightened by the presence of a goodly number of ladies, who each wore an orchid corsage provided for them by Mrs. Spengel, was attended by 192 persons. President Crewe welcomed the guests and particularly noted absence of John A. Moritz, who had been our president at the time of his death in September, paying tribute to him as an outstanding wire man and as a man who, from the time The Association was formed in 1930, had done so much to contribute to its growth and success. He introduced the officers, directors and guests seated at the speakers' table and then presented the awards for those papers adjudged by the Awards Committee as being the most outstanding ones published in Wire and Wire Products in 1951. The Medal Award, a Tiffany bronze plaque, was given to Dr. Bruce W. Gonser, Research

Supervisor, Non Ferrous Metallurgy, Battelle Memorial Institute, Columbus, Ohio, for the most meritorious paper: "High Strength Copper-Silver, Copper-Iron and Copper-Iron-Chromium Wire." A certificate of Honorable Mention for the best ferrous paper was awarded to Dr. Carl A. Zapffe, Consulting Engineer, Baltimore, Md., for his paper: "Surface Active Agents and Pickling Brittleness," and a certificate of Honorable Mention for the best non-ferrous paper was presented to C. A. Litzler, President, Industrial Ovens, Inc., Cleveland, Ohio, for his paper: "Some Developments in Nylon and Polyethylene Wire Extrusion."

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Telegrams from Reginald S. Brown of Ryland Brothers, Ltd., England, and Kenneth B. Lewis of Worcester, Mass., in which both expressed their wishes for a successful convention and their regret over their inability to be present.

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Harvey B. Jordan, President of the American Steel and Wire Division was our guest speaker. He was introduced by his old friend, Ralph B. Roth, Non-Ferrous Vice President of The Association, who said:

Your next speaker, a good friend of mine, causes me some concern in his description. I'd like to retain his friendship and yet I feel I should be frank with you good people. There are a few things you ought to know about him.

"My friend is a stranded Oscar of the Waldorf. He's a fugitive from the legal profession, a tricky fellow with a pair of dice, and the President of American Steel & Wire Division of U. S. Steel.

"If you—like our retiring director, Jim Thompson—could look over your back fence into our speaker's back yard, you would see an imposing stone grill not unlike a blast furnace.

"More often than not during summer weekends, he can be seen holding forth over this hickory smoking grill like a maestro conducting Beethoven's Fifth. Considering the broiled steaks and roasting ears this fellow turns out and judging from his ear-to-ear grin immersed in perspiration, you'd say our speaker was just enjoying another day at his chosen work.

"As devastating as his cooking is, the surprising thing is that he really wanted to be a lawyer. As a matter of fact, he sold the law profession down the river for one cent.

"That was back on a sweltering June day in 1915. Sweaty and covered with the red flue dust he was shoveling, he ended the day half dead and thinking some unkind things about a relative who induced him to forget law and go into the steel business at American Steel and Wire's Central Furnaces & Docks here in Cleveland. The law profession was looming up in his mind again, when he was called in and made foreman of the clean-up gang he worked in.

"That meant he kept right on shoveling with the rest of 'em but he got a penny more . . . and there went the law profession.

"I suppose over and beyond his cooking there are several other characteristics which can be said to have contributed to his rise to his present post.

"Legend has it that there's a Pullman Porter on the Northwestern Railroad who can testify to our speaker's innate ability to put the right man on the right job.

"As vice president on an inspection trip to Duluth, he ran afoul of some executive-friends who lured him into his first game of African dominoes.

"Twenty dollars out in ten minutes, he was convinced he had more to learn about odds, when this porter happened by. Our speaker stepped aside, invited the anxiously willing porter to take his place and banked him. In a half hour they split a neat profit . . . ever since our speaker never wants for Pullman service on the Norhwestern nor has he been invited into another game of dice.

"While some of his associates will tell you he can erupt on occasion, he's quite a self-contained fellow. As a matter of fact, very few know this (that is up until now) but there was only one instance when he was caught unawares.

"It was a dark winter day three years ago in December. The Public Relations Department had asked him to stop by a studio and get a picture taken.

"In the morning darkness he accidentally donned a pair of trousers that didn't match his coat.

"The error was discovered at the photographer's. After he was snapped from the shoulders up amid a few chuckles, arrangements were made to send a matching pair of trousers from his home to his office.

"The door to his office carefully locked and he was proceeding to change —as the old saying goes—and there he learned, as he stood there with his trousers on his arm, that he had been elected president of American Steel & Wire.

"Seriously, in his 37 years with American Steel & Wire, from flue dust shoveler to president, Harvey B. Jordan has been a dynamic figure in the steel industry and an inspiration to those who have worked with him in the mills, and in his community.

"Born in Lansing, Michigan, the son of a Presbyterian Minister, he was educated in Newcastle, Pennsylvania, and at Penn State. He is widely known for the attribute which spotlighted him for leadership throughout his career—namely, an understanding of and a fiery devotion to the development of the industrial Management Team.

"Not only is he keenly concerned with the human element in management, he is held in high esteem throughout the industry for his expansive technical knowledge of iron and steel making and particularly of wire making. He also is an avid promoter of research.

"In civic life he pursues community service to his fellow citizens with the same zest he devotes to business.

"Likewise, he treads in the footpath pointed out to him by his father. He has served as Chairman of the Board of Fairmount Presbyterian Church . . . and let me add he is a pretty determined fellow after all. For you see he went to night school and got his degree in law at Cleveland Law School in 1929.

"I take personal pride in giving you your friend, and I hope—still mine—Harvey B. Jordan, president of American Steel & Wire, and Director of United States Steel Company, who will speak to you this afternoon on "Another Avenue to Productivity."

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Mr. Jordan's talk, which was both impressive and inspiring, is published in full elsewhere in this issue. He dwelt at some length on a new type of management-employee relationship that must be brought about, which, if accomplished, will go a long way toward the elimination of misunderstanding and strife between these two camps, whose real interests are identical.

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The Mordica Memorial Lecture, the pièce de résistance of the Annual Luncheon was to have been delivered by that dean of wire men, Peter Igoe. A week earlier, however, Mr. Igoe underwent a minor operation and because he was unable to be with us, his lecture was presented by Charles H. Schiller of American Steel and Wire in a most able and interesting manner. Illustrated by color slides, we have seldom had a paper that was easier to take, more entertaining—nor better delivered. Thank you, Mr. Schiller, for pinch-hitting so capably. The lecture is printed elsewhere in this issue.

The Annual Meeting of The Wire Association

Convening at 4 P.M. with substantially more than a quorum, with President Crewe in the chair, the business meeting of the members of The Association was called to order.

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Mr. Brown, Executive Secretary, read the minutes of the preceding meeting, and these were approved as read. He then read the annual report as Secretary-Treasurer of the Association, which was also approved as presented, with the detailed financial statements placed upon the table for inspection by members. Mr. Crewe, who as Vice President of the Ferrous Division,

had automatically become president under the provision of the By-Laws upon the death of John A. Moritz, former president, announced that at the meeting of the Board on Monday, November 10th, the following new directors had been seated:

Allan B. Dove, Superintendent, Dominion Works, Steel Company of Canada, Ltd., Lachine, Que., Canada

James E. Flood, Chief Chemist, Plastic Wire and Cable Corp., Jewitt City, Conn.

Bruce W. Gonser, Supervisor, Non-Ferrous Metallurgy, Battelle Memorial Institute, Columbus, Ohio

Uno V. Johnson, Superintendent, Rod and Wire Div., Detroit Steel Corporation, Portsmouth, Ohio

Ralph B. Roth, Vice President, Ludlow-Saylor Wire Co., St. Louis, Missouri

John L. Sanderson, Acting Superintendent, Wire Mill, Keystone Steel and Wire Company, Peoria, Ill.

Benoit J. Sirois, Metallurgist, Phelps-Dodge Copper Products Corp., Bayway Plant, Elizabeth, N. J.

S. R. Snow, Asst. to Vice President, American Steel and Wire Div., U. S. Steel Company, Cleveland, Ohio

Leslie C. Whitney, Chief Metallurgist, Copperweld Steel Co., Glassport, Pa.

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Following this President Crewe announced that the Directors had approved these meetings of the Association for 1953:

April 14 & 15	**Trenton, N. J.**
May 7 & 8	**Montreal, Canada**
June	
(about the 15th)	**San Francisco, Calif.**
September	
(to be determined)	**Waterbury, Conn.**
November 9-12	**Chicago, Ill.**

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For the Mordica Memorial Lecture in 1953, Mr. Crewe stated that an invitation had been extended to Mr. Charles D. Johnson, retired president of Johnson Steel and Wire Company, Worcester, Mass., to accept this honorary assignment.

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Officers for the coming year who had been elected and/or re-elected were announced as follows:

President—Leonard C. Crewe, Jr., President, Maryland Fine and Specialty Wire Co., Cockeysville, Md.

Vice President, Ferrous Div.—Tom M. Girdler, Jr., Asst. Manager of Operations, Union Drawn Steel Div., Republic Steel Corporation, Massillon, Ohio

Vice President, Non-Ferrous Div.—Ralph B. Roth, Vice President, Ludlow Saylor Wire Co., St. Louis, Mo.

Secretary-Treasurer — Richard E. Brown, Publisher, Wire and Wire Products, Stamford, Conn.

Changes made in the Medal Award Committee of the Board of Directors were: Allan B. Dove, Chairman, and Sidney Rolle, member.

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President Crewe also stated that the Board had authorized the engrossing of a resolution, passed by it on Monday, to be sent to the family of John A. Moritz.

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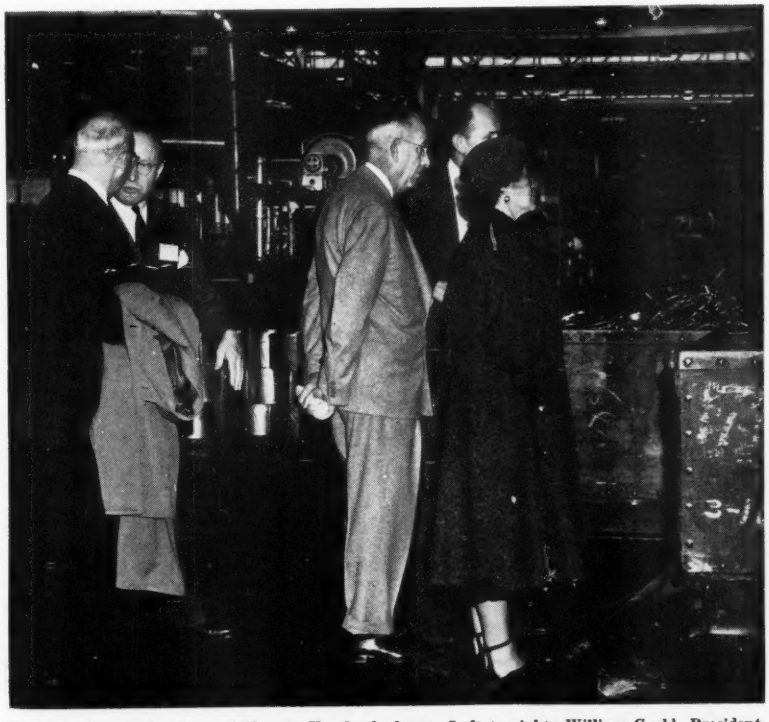
The Program Committee appointed to arrange for papers for the 1953 Annual Convention were announced as follows:

General Chairman	**Tom M. Girdler, Jr.**
Ferrous Div. Chairman	**John L. Sanderson**
Non-Ferrous Div. Chairman	**William L. Wells**



Picture taken during tour of Chase's Cleveland plants. Left to right: William Gould, President, Lincoln Wire Co.; C. von Lindern, Jr., Man. Dir., Netherlands Cable Works; S. Ray Snow, Asst. to Vice Pres., American Steel and Wire; Mrs. Gould. In background, their Chase guide.

There being no other business a motion to adjourn was put, seconded and approved.

The Stag Smoker Dinner

581 persons—a record number—attended this affair on Wednesday evening. The dinner was good, the show excellent and a fine spirit of camaraderie pervaded the atmosphere. Much favorable comment was later heard on the splendid quality and character of the acts, for all of which we are greatly indebted to Eber J. Hubbard, Chairman of the Entertainment Committee, who, when not digging up acts for the Smoker-Dinner Show, puts in some time as president of the Hubbard Spool Company in Garrett, Indiana.

The Ladies

Through the courtesy of the American Steel and Wire Division of the United States Steel Company, the wives of Association members who came to Cleveland, were entertained on Tuesday with a luncheon at the Cleveland Athletic Club, after which they were taken on a sight-seeing tour of the city, winding up an interesting afternoon with a visit to the Nela Works of the General Electric Company. Forty-eight of the ladies in attendance participated in this interesting program.

(*Please turn to page* 109)

Wire Association Proceedings

Discussions of Papers Presented at the Annual Convention of The Wire Association at Cleveland, Ohio, November 10-13, 1952

JOINT SESSION, FERROUS AND NON-FERROUS DIVISIONS
MONDAY, NOVEMBER 10th

The Joint Technical Meeting for both Ferrous and Non-Ferrous Groups of The Wire Association convened at 2:15 o'clock, Chairman E. Jefferson Crum, Technical Consultant, R. H. Miller Company, Homer, New York presiding.

Chairman Crum: Gentlemen, this is indeed a great honor for me. I will immediately turn the meeting over to your new President.

Now I didn't get any previous instructions as to what I should say about him. I will just pass over some of the facts lightly, but I would like to say that I read Ken Lewis's book a week or so ago, and one of the chapters in there is "The Vanishing American." In it he says that opportunity is practically all over with as far as starting up your own wire mill. There are just so many odds against you you just can't do it any more. So it is more or less a thing that used to be done, but no longer is possible.

It is very appropriate that we have as our new President a man who has been able to surmount all of those odds, get through all the government red tape, etc., and have a nice growing mill of his own. It more or less marks a new point in the history of The Wire Association to have such a man as President.

It is also rather significant that he is a protege of our original President, John Mordica, and another President, Carl Johnson, and also a protege of the subject of this "Vanishing American," Dave Johnson.

Without going into any further details, I would like to present to you your new President, Mr. Leonard C. Crewe, Jr. (Applause)

President Crewe: Chairman Jeff, members of The Wire Association, and guests, I face you as the ghost of a "Vanishing American." We are now officially opening the 23rd Annual Wire Association Convention. It is my honor and privilege to extend to you the greetings and the welcome of your officers and directors.

We proceed on this occasion with the full realization that we have lost a great friend. No one since the first President, John Mordica, has exemplified the principles on which this Association is founded any more than the tenth President. No one has been more loved; no one has given more freely of himself, and no one will be more missed than this President to whom I pay, and I know you pay, the highest possible tribute, John A. Moritz. Again, gentlemen, we have lost a very dear friend.

The Program Committee, with Bob Peterson, Chairman of the Ferrous Division, and Les Whitney, Chairman of the Non-Ferrous Division, has arranged for your pleasure a series of papers unsurpassed at any previous convention. Walter McShane, Assistant General Program Chairman, has been most energetic here in Cleveland in his preparations for this convention. This includes a ferrous plant inspection trip through the Cuyahoga Works, American Steel & Wire Division, United States Steel Corporation, scheduled for Thursday morning. It also includes a non-ferrous plant inspection trip through the Cleveland Works of the Chase Brass & Copper Company scheduled for Thursday afternoon.

At all of these conventions we are greatly indebted to the tireless efforts of Dick Brown and Ruth Spengel, and I am sure we are very grateful to all of these people for their efforts.

It is particularly interesting to note that our registration on this occasion has reached an all-time high, and that this registration includes some 75 visitors from allied countries — Canada, England, Holland, France, Germany, Spain, Italy, and India. I don't think I have missed any. Oh, yes, Belgium and Austria. Greetings.

We are particularly proud, too, of the development of our Non-Ferrous Division, which section has an all-time high registration only exceeded by the number attending the first and only Non-Ferrous Regional Convention held in Waterbury in September.

The Wire Association can be proud of the job that it has done and is doing for national defense, not only in plant expansion, but also in the production of many special wires in large quantities. I personally talked to the chiefs of the various wire divisions of N.D.A. just a week ago, and they send to you their compliments, their congratulations for the cooperation and the job being done so well for national defense.

I am sure that these accomplishments have been materially aided by the opportunities afforded at these meetings for friendly discussions of technical and production problems and by interesting plant inspection trips.

In our discussions of papers to follow, we sincerely urge each and every one to partake of the ideas freely with no holds barred. This is the most important part of the convention and plenty of time has been allocated to the discussion periods.

All in all, gentlemen, there is no room for gloom in the wire business. With population increasing at the rate of over two million a year, and with individual savings at a new high, and with 160,000 recognized uses for wire, and, last but not least, with a new Administration in Washington, let's go! There is plenty of room for all. (Applause)

Again, it is a pleasure to welcome you. (Applause)

Chairman Crum: Since this is a combined meeting of the Ferrous and Non-Ferrous Sections and the only such combined meeting that we have, it is quite appropriate that we have as our first paper one that more or less, I was going to say welds the copper and the steel together, but it is instead of that a new process, the manufacture of steel wire, copper-coated electrolytically.

This paper is to be given by Mr. A. M. Gray, Assistant Superintendent, Development Engineering, Western Electric Company, Baltimore, Maryland. (Applause)

Mr. Gray: I would like to preface my paper with the remark, in line with Mr. Crewe's remarks, about your friendliness. This being a new experience to me—I have never been called on before to address a technical society with a paper—I have been impressed in the few hours I have been here with the general friendliness of this gathering, and I congratulate you gentlemen on the friendly spirit that has been shown.

. . . Mr. Gray read his paper: "Manufacture of Copper-Steel Wire by Electrolytic Process."

Chairman Crum: You have done a very fine job, Mr. Gray, not only in delivering the paper, but I think you have been a little modest about your position in developing this new process.

Mr. Gray's Company, in case any of you are not familiar with Western Electric Company, which is the telephone equipment manufacturing branch of the Bell System, and Mr. Gray's plant, the Point Breeze Plant, which many of you saw on your boat trip down the harbor of Baltimore in 1950, is one of the companies that recognized quite a

long time ago that the engineer is here to stay, so they decided to put him to work, and believe me they really have engineers. Mr. Gray has coordinated the efforts of all these various mechanical, chemical, and what-not engineers, in the development of this process. I had the very good fortune of having a personally conducted tour through this new electrolytic plant, and it was an eye-opener.

There were certainly a lot of questions that had to be answered. There were material handling, chemical and electrical problems, and I know there are many in the audience that have a particular phase that they would like to develop a little bit more. Mr. Gray has consented to answer questions.

A Member: You speak about electrolytically depositing copper on wire. Is there any reason why it couldn't be done on a No. 5 rod, due to surface conditions or some other difficulty?

Mr. Gray: No, there is no reason why you couldn't deposit copper on No. 5, or any size rod, except that, and, in saying this now I want you to know that I am going out on a limb a little, I have only a glimmer of this, but the glimmer says that when you get above the .005 to .006 thickness in copper deposition your problems increase geometrically, and I mean literally geometrically.

If we learned anything in this development we learned that to get a good copper deposit you must start right, start with the very finest crystal size that you can deposit. As the diameter of the wire grows, the crystal size grows, and as the crystal size grows your problems increase geometrically. Beyond 5 or 6 mills, I don't know whether that is really the threshold, but somewhere in that region you run into problems.

A Member: I have had an opportunity to examine some of your wire and have been tied up in a few experiments along somewhat parallel lines. Based on those two points I would like to make a few remarks here.

Mr. Gray and his associates at the Western Electric Company are certainly to be congratulated on their contribution to the art of producing copper-covered steel wire. Electrodepositing copper on steel is not new and, since this process follows established principles, it might be said by inexperienced people that this development represents only the commercial adaptation of an old practice. This, however, would underestimate the amount of research and development that I understand was conducted on this project before the commercial plant was built. There is no great difficulty in producing thin coatings of electrodeposited copper, but the difficulties encountered in producing heavy copper coatings by this method increase— I repeat what you have said— in geometric progression with the increase in coating thickness. Such problems are not only chemical or electrochemical in nature but include mechanical and electrical phases of the operation.

The process described was designed for the production of a large tonnage of a single size and grade of wire. Under such conditions, it is possible to operate continuously on a standardized procedure which should result in a relatively low operating cost. For mills that would have to produce small lots of different sizes and grades of wire, the cost of this operation would be materially increased. The possibility of electrodepositing copper on wire at an intermediate stock size introduces drawing and heat treating problems.

Satisfactory operation of a plant of this nature requires laboratory control throughout the entire operation. This includes not only the chemical control of all the various solutions and the maintenance of the proper distribution of electrical current, but control of such important details as the maintenance of the purity of solutions. Slime from impure anodes, dust from the air, crystallized salts, or similar foreign materials in the solution, can cause nodular deposits resulting in a rough surface on the wire.

The wire produced by this process has an exceptionally high elongation resulting from the heating cycle to which it is subjected after the deposition. The effect of such treatment appears to be tied up with the carbon content of the steel since lower carbon steel does not react in the same manner. I am wondering whether Mr. Gray has any theory to explain the mechanism of this change in physical property.

The practical value of such high elongations is, I believe, highly debatable. Based on data that we have accumulated, we have made an analysis of the sag performance of this wire as compared with a similar wire with a normal elongation of about 2.5% in 10". This analysis was based on the heaviest accepted design loading for this country as specified by the National Electrical Safety Code prepared by the Bureau of Standards in conjunction with engineering representatives of companies operating overhead lines. This specifies a ½" radial ice load with an 8-pound wind acting on the iced conductor at 0°F. The stringing sag practice was similar to that specified by A. T. & T. On the basis of this loading, the sag performance of the two types of wires is substantially the same. Intangible factors at high tensions have resulted in a practice of sagging the conductor so as to keep maximum tensions to less than 70 or 75%. Where loadings in excess of the assumed standards are indicated or expected, the standard practice is to use increased sags in the drop wire so as not to exceed a maximum tension of around 70%.

Since a large part of the high elongation occurs just before rupture, at 90% of the wire strength or higher, its value is questionable. Any design studies on tensions of this order are considered to be highly theoretical and of little practical interest.

Mr. Gray: While it may not prove to be effective in all cases, we feel that, since we get the increased elongation for practically nothing, the cost of some low-voltage AC, it is actually a by-product of the operation of annealing the copper. We don't feel that we have risked a great deal even if we don't get the anticipated result.

A Member: You claim after you get around 5 mills in thickness you have trouble with the deposited copper. We are able to deposit copper with periodic reverse plating, using cyanide reverse plating, up to three or four times that thickness of copper with that advantage mentioned by the previous speaker of plating to different thicknesses. The problem is overcome by using special cyanide copper plating processes.

Another thing I would like to mention is the adhesion you get to the steel with the copper. Do you have any data showing what the adhesion is in your particular case; and, if you do, does it make any difference as you vary the thickness of copper? I imagine in the laboratory you might have plated different thicknesses. I think from your slide you showed you only plate to about 2 mills in about 3 or 4 minutes.

Mr. Gray: Two and a half to three mills, not minutes.

A Member: Is there any problem to adhesion and the ductility of the copper?

Mr. Gray: None that we have so far recognized.

On an acid test we took some of this as drawn steel wire that had been plated up to this two or three mill thickness, and drew it down to 30 gauge. Always the break came when the steel failed. We never experienced a peel-back or dislocation of the copper coat, but since we weren't too interested at the time in drawing down a plated wire we never pursued that to its ultimate.

A Member: I would like to answer one question. It is that copper can be deposited on a Number 5 rod. We do it every day on 4. We've done it since 1946, and the thicknesses exceed thicknesses mentioned by Mr. Gray.

I don't want to give the impression that I minimize the wonderful achievement of this Western Electric operation. I think it is wonderful and Mr. Gray has not emphasized enough the fact that by choosing a different base metal, they achieve savings; I think they could go much further by using still more fine grades and thinner wires to achieve the same purpose.

A Member: I am wondering if the heat treatment you give, providing elongation might be more or less of a secondary accomplishment, whereas you might really be trying to eliminate hydrogen embrittlement. Might that be a factor?

Mr. Gray: Hydrogen embrittlement up to now we have not encountered in recognizable form. The wire is cleaned as anode so that oxygen is generated. It is plated in the cyanide copper, cyanide bath, as cathode, and a certain amount of hydrogen comes out of that solution. The major plate, however, is from copper fluoborate, and up to now we have never seen a hydrogen embrittlement from that solution.

Our primary purpose in this heat treatment was to anneal the copper, by which we hoped to increase the conductivity slightly.

A Member: I would like to know if the R-38 you referred to has the same conductivity as the wire for which it was substituted; in other words, the same or more.

Mr. Gray: Yes, the same resistance per unit length.

A Member: It does have the same?

A Member: Mr. Gray, I have three questions I would like to ask you. The first one you can probably answer very rapidly, and that is, the length of that line is amazing. What happens if you get more than one broken wire?

Mr. Gray: Well, we are a little bit on tenterhooks about that ourselves. We provided enough flexibility in that machine so that the number of strands could diminish from 25 to 20 and still operate through that automatic resistance control.

A Member: Would that affect your coating weight though?

Mr. Gray: No.

A Member: Your coating weight would still be the same?

Mr. Gray: The control would reduce the total copper sufficiently so that it would be treated just as 25, but that bugaboo didn't arise either. It is a comparatively simple matter to string a replacement wire. As a matter of fact, since this job is on piecework, the operators being allowed 30 minutes to restring a wire, usually get it down closer to 3. Actually it takes them about 10 minutes.

A Member: In your wash water from your cyanide and acid plating, do you treat that prior to descending to the sewer?

Mr. Gray: No. Each of the baths is succeeded by this drag out operation, which washes off the wire and feeds back into the system most of the chemicals, and when we blow that clear the amount of chemicals that go down the sewer are relatively small.

A Member: That is not detrimental to your sewage system, or in so far as stream pollution is concerned?

Mr. Gray: No. It happens to be a fair balance between alkali drag out and acid drag out, so the pH of the discharge is low.

A Member: In other words, practically sulphur.

Mr. Gray: Practically.

A Member: The third question in that brass section; do you pay any particular attention to the kind of brass?

Mr. Gray: That is a point of infinite care at all times. That is an old friend we have lived with for ten years, but we don't know about that. The troubles you can have with that we don't want to know.

A Member: I would like to know the conductivity of the copper as plated and after heating, and, if there is a difference, what does the heating do to the copper to make it different?

Mr. Gray: I am afraid I am not in a position to answer that simply because I don't know. We never followed it up very carefully. On more or less crude laboratory examination we thought we were increasing the conductivity of the copper by approximately 2½%, but we didn't prove that.

Chairman Crum: Our second paper this afternoon is also appropriate. It is entitled "Methods Improvement Study." Anyone who thinks they have methods that cannot be improved can be excused at this time, but the rest of us will go ahead and listen to the Works Industrial Engineer for the Newburg Works, American Steel & Wire Company, here in Cleveland, Mr. Paul V. Crooks. (Applause)

Actually we in industry are concerned with costs, are we not? It behooves us all to get on the ball and find out how we can lower costs. We are not going to have time this afternoon to take up many individual problems, gentlemen, but we are going to discuss primarily a philosophy.

. . . Mr. Crooks read his paper . . .

Chairman Crum: Thank you very much for this fine presentation. It certainly must bring a lot of points to mind to a good many of you men who are charged with the operating of the mills. Is there anyone here who would like to start off the discussion?

A Member: You mention an automatic bundling machine. Do you use wire or flat strip on that?

Mr. Crooks: At this particular plant they use flat strip.

Chairman Crum: Any other questions? This certainly looks like fine material that can be used by various people certainly. We ought to be able to take this thing right intact and take it back to the plant and put it into operation.

One thing I am interested in is this gadget here, Paul. I have never seen one of these things before. What is that anyway?

Mr. Crooks: This machine, gentlemen is known as the View-Graph Slide Projector. One of the nice things, as we demonstrated here, you can actually write on it as you are talking. It uses slides somewhat similar to negatives although they are actually positives as you see. It certainly makes a very forceful way of making a presentation. We use these to a great extent.

Mr. Gray: I would like to make a remark in respect to its utilization. It occurred to us that other than to go through this business of lining and drawing, and so on, you can take a common piece of cellulose acetate, transparent, double closure, and make the drawing directly on the inside face, close the thing up, and use it.

Mr. Crooks: That is right, of course. This slide also is somewhat similar to that, Mr. Gray. This is just a blank slide in which I have written some figures. In order to write on this slide we use a plain, ordinary, white china marking pencil. You can get them in any office supply store or five-and-ten. The nice thing about it here, if you get finished and want to use the slide over again, you just erase it like this, use your handkerchief. They are from the View-Graph Company.

Chairman Crum: Are there any other questions that come to mind at this time? It is a rare opportunity. We have Mr. Crooks right here now.

If not, why that is all. Thanks again, Mr. Crooks, for a very fine presentation. (Applause)

TUESDAY MORNING SESSION
FERROUS DIVISION
NOVEMBER 11, 1952

The Ferrous Division of The Wire Association convened at 9:30 o'clock, Uno V. Johnson, Superintendent, Rod & Wire Division, Detroit Steel Corporation, Portsmouth, Ohio, presiding.

Chairman Johnson: Will the meeting please come to order. I am very happy to see such a fine audience here. We have a long program, but I think it will be an interesting one.

Last night in making my rounds about the hotel, I made several attempts to start discussions about lime with some people who are engaged in the manufacture of wire drawing compounds, but I had no real success. I got one answer from one of the boys. When I asked him, "What do you know about lime," he said, "All I know is that it is white." So I decided to wait until this morning to hear the first paper, "Lime for Wire Drawing," by Jere Heisler, Assistant General Foreman, Wire Drawing, Bethlehem Steel Company, Sparrows Point, Maryland.

. . . Mr. Heisler delivered his address . . .

Thank you, Jere. You have done a wonderful job in presenting your paper, and I am sure everybody will agree. I think most of us old-timers have not given proper attention to many details you have mentioned, and so have not had the best possible results. I am sure there are going to be some questions.

A Member: I enjoyed the paper very much, Jere. I think that recirculation is excellent. The function you mention of particle size in colloid chemistry is a matter of deflocculation and through your pump you get the effects that we tried to get with a colloid mill to secure a true emulsion, or those same factors you hold for pigments, that you get by ball milling.

There is one chemical factor I wonder if you checked, the degree and amount of carbonation. When you use slaked lime and sandstone you revert to limestone, that is, the bonding strength plus a chemical reaction which you gain by a silicate pre-coat.

Mr. Heisler: In the series where we analyze the tub daily for a period of three weeks, we took all of the factors that we could possibly pick out of the lime solution, the impurities, etc., and I believe we did follow the carbonate, but in plotting all of that on a single graph and taking adherence results and settling rates, in analyzing the charts of that, we were never able to get a significant trend.

A Member: Was that silicate or methyl silicate of the water glass type?

Mr. Heisler: I believe it is ortho.

A Member: You spoke of dipping the rods first into a sodium silicate water glass. Do you find that contaminates the lime to a certain extent?

Mr. Heisler: I believe you do get a chemical reaction there, and you do deposit some calcium silicate in the lime bath, but other than that the only thing I can tell you is that we have operated silica tanks ahead of our lime coating tanks for a number of years, and perhaps with the alkalinity of the silicate being consistently added into the lime tank, that may do us some good. That part of the theory hasn't been gone into.

Actually, as far as the performance of this recirculator unit is concerned, we do operate the silica tank ahead of the lime coating tank, and it does not harm us to the extent of getting too many impurities or building too much sludge in the bottom of the tank. We can get an average of sixteen weeks out of it.

A Member: I thought that a sludge might form that would not stay suspended, or is there a pickling of the mixture caused by the mixture of sodium silicate and calcium hydroxide?

Mr. Heisler: I wouldn't say there isn't to a certain extent.

A Member: If you dry your sodium silicate first, isn't that a pretty good practice?

Mr. Heisler: I would like to go into that a little more. He mentioned your best results in using your silica bath ahead of your lime are in allowing it to dry completely ahead of your lime coat.

We, in attempting to keep the production through the cleaning house up to the rate the drawing room is operating, more or less have to short-cut that process. We merely dip into the tank and hold it there just in the process of moving over to the lime tank. If we had the time and the capacity, the correct way to use the silica tank would be to allow it to dry before you lime coat.

A Member: You mentioned the lime bath over a live steam coil. You have the closed steam coil in the smaller unit. Is there any advantage to having the open steam coil in the larger unit?

Mr. Heisler: I can tell you the significance of it in telling you how we attempt to operate it. We don't particularly like to use the steam in the main tank. If we could hold the solution at 190° to 210° by simply operating the small closed coil in the collector tank, we would do so. Normally we are not able to do that. We have to crack the valve which lets the open steam into the main tank.

A Member: You mentioned in the beginning that your work was done primarily with high carbon rods. However, I wonder if you did any work on process wire in your investigation. What kind of adhesion did you get on processed wire for redrawing?

Mr. Heisler: You will get some of the advantages out of this tank by dipping wire in the same percentage of improvement with good adhesion to wire that you would see in getting better adhesion on rods. To tell you the truth, we do not actually work with wire. We process very little wire there. I think everybody knows that the proposition of trying to get lime to stick on a smooth piece of already drawn wire is even tougher, and we never did work with wire on this particular unit.

A Member: I have been sitting back here not wanting to ask Jere these questions.

The first one is, some of these folks around here, at least I have heard, slake their lime differently than we do. They do not slake directly into the tub as Jere has outlined. We would like to know if there is any real advantage in slaking and letting it sit around for a month rather than slake right into the tub. I think that is a point for argument.

The other thing is, we have talked a lot about adhesion tests. Is there any scientific adhesion test other than just drawing the wire and saying it is good or bad from that standpoint? We have a couple, but we would like to know whether there is any actual scientific test, or if somebody else has some scientific test for measuring adhesion.

Mr. Heisler: In answer to this question, would anyone care to comment on it? I think that has been a much discussed topic in years gone by, that is, pre-slaking and aging in a separate bin against this proposition of doing your hydrating directly in the operating tank.

The other question was about a better system of actually measuring adherence. We just happened to hit upon this method using a glass surface, and it was mentioned here for anyone's use who wants to actually go into this thing further and start working against adhesion with the various variables you get in hydrating. Has anyone got a better method of measuring? I believe that is what Bob would like to know.

Chairman Johnson: I would just like to say that many wire mills use dehydrated lime. In Jere's paper he used quick lime. I know that we had that experience and we do not slake our lime. I believe with the recirculating system that Jere mentioned you do as good a job as you can with any other. That has been our experience.

Mr. Heisler: I would like to say one more thing. If any of you folks are interested in what we have done here and would like to try it, I would be willing to give you the particular dimensions of this unit that we have. I think that the layout, the way it is laid out with the overflow on the long side, has something to do with the establishment of the equilibrium point which allows you to operate with good adhesion over a long period of time. If you do decide to go into it, I would be very glad to supply you with the copy of the print with the dimensions on it.

Chairman Johnson: Jere, thank you very much. You did a swell job. (Applause)

Next we have another interesting paper. I know that there are a lot of people in this audience who manufacture ACSR Wire. Frank E. Weise, Jr., Assistant Superintendent, Rods & Wire, Portsmouth Steel Division, Detroit Steel Corporation, Portsmouth, Ohio, will present the next paper on "ACSR Wire."

. . . Mr. Weise presented his paper accompanied by a motion picture . . .

Mr. Weise: Before we open the meeting for discussion, I usually take the easiest way out, so we have with us our Metallurgist of the Rod and Wire Division, whom I would like to introduce to you, Mr. James Van Horn, who will help me answer the questions. Also, Mr. Floyd Renning, General Foreman of the Handling Department, who will also help us. (Applause)

A Member: Frank, at the beginning you made a statement that all of your coil wire was lead patented because it was a part of some special properties. What are the special properties?

Mr. Weise: There are several reasons why we do lead patent. One is the fact we have found it gives more uniform structure to the steel. Another thing, which you undoubtedly know, we want the security of the little higher tensile on our patented rod and, therefore, on the smaller diameter rod we are able to reduce the drawing operation by one draft.

A Member: I was rather interested in that roll without grooves. The lower roll in the pan. Have you found any tendency for the wires to drift?

Mr. Weise: Although I did not mention it today, it is mentioned in the article in "Wire and Wire Products." We do have a separator located directly in front of that roll and the separator has a double row of pins, closed at the bottom and open at the top, so you can lift the wires from one slide to the operator. The pins of the separator protrude approximately three inches above the zinc level, and that tends to keep your wires from going back and forth across the room.

Also, at the top of the header, which is located approximately seven feet above the zinc bath, are individual shifts, so prior to the submerged roll and after you go through your cooling chamber, we do have a separator. Does that answer your question?

A Member: I was asking that question because I was thinking of a heavier wire. There would still be a tendency to drift close, in spite of the separator ahead, the seven foot separators of the metal. There would seem to be a tendency to drift.

Mr. Weise: I would say off-hand the fluctuating wouldn't be over a quarter of an inch. Of course, if you had a grooved roll and it started to go back and forth out of the groove, you know what is going to happen.

A Member: You mentioned in your paper that drawing room welds in single wire reinforcement were cut out. Those for multiple wire were allowed to go through in the finished wire. Do you know why the basic reason for ASTM single wire reinforcement requires it be made prior to the patent operation?

Mr. Weise: Basically as to how some of the physical tests are arrived at, or demanded by the customers, I do not know. I can cite specific examples on other tests, but to produce a continuous steel wire in a unit length for SW material, the requirement is either to make the weld prior to patenting, which will give you slightly higher tensile. Also, I think you do make wire rope in strand. When you have one single steel wire, you take every precaution available to try to make the best product because you are a little worried about only one steel wire with a number of aluminum wires.

Therefore, to make that restriction a little tighter to keep a mill under control, that is the reason they do it, to get that tensile strength. You do not have it in the one steel wire, whereas in multiple wires you have a number of steel wires. If one wire does break, you still do not lose your tensile strength.

For a more detailed explanation, I have noticed some people here who purchase and use ACSR wire, aluminum people. I am sure they would gladly expand further on that.

A Member: In your welding prior to patenting, are you using the same welding machine, or do you use a special welder?

Mr. Weise: No, it is the same type Micro-Welder, the J-4. There has been quite a bit of discussion on making welds prior to the patenting and having them stay together, which make a respectable yield, but we have found that it isn't so much the welder as the individual making the weld. If you change your manpower frequently, you are going to have a lot of weld breaks, whereas the same individual day in and day out making those welds comes up with a very decent, respectable, limited number of breaks.

A Member: The reason I ask, some people are using a different type of welder.

Mr. Weise: No, we haven't, although we have talked to Thompson and various other people concerning welders.

A Member: To carry on a little further, Frank, what tests do you make on your welds after you do weld them, and why do you think that the weld before patenting might be better than one made in the drawing room. Take single wire against multiple. What tests have you made?

Mr. Weise: I would say that the only

test we actually do make is the fact that the weld is giving all the operation without breaks. As far as the weld made prior to patenting, or a weld made in drawing, the majority of our customers have come in and taken samples of welds and tested them to their satisfaction, but the fact that all the welds do the following operations is the sum and substance.

A Member: On welds before and after patenting, we made a series of tests on them. You must recognize you have a human element in wire drawing to make a weld that will go through the machine without a break. We find the worst feature of that setup is the enormous decarburization of that welded area. Naturally you are going to lose the tensile strength from that lower carbon content. Welds made in your draw are considerably lower in tensile strength and yield, etc.

A Member: I am interested to know how many people you used to operate the strapping operation.

Mr. Weise: Actually we have had the strapping operation in for a few months, and we are using two men. As far as the capacity of the strapping machine, Signode could give you more detail, but there is no reason you can't expect five or six hundred coils for AR. We do not have a time study yet.

Chairman Johnson: The machine will do two bundles a minute. We have found it does a much better job than any hand bundling.

Thank you, Frank, for a nice job. (Applause)

Our next paper is more technical, and I am just hoping that we have alloy steel men in the audience. The next paper will be presented on "Selection and Processing of Chrominum-Nickle Stainless Steels for Magnetic Applications," by Mr. F. K. Bloom and Mr. J. S. White, Metallurgists, Rustless Division, Armco Steel Corporation, Baltimore, Maryland. I understand that Mr. White will lead off.

. . . Mr. White read the paper . . .

A Member: I would like to know in that last chart, Number 3, if there was any test made on tensile which would show that the tensile changed along with the coercive and residual?

Mr. Bloom: I believe that data was from Mr. Storcheim's paper, and I don't believe that he reported tensile properties in that case, but we have had experience in drawing larger sized wire where we find with the increasing rate and drawing that the tensile will fall off.

The general fact of higher drawing steel was to make the wire act as if it were drawn from a more stable analysis, for instance, one with a higher nickel content, but we don't have specific tensile figures for that last chart you are speaking of.

A Member: Have you played around any with the effect of aluminum on the magnetic strength of 18-8, for example, increasing aluminum content, say up to 4 per cent? And have you tried alloy 17-7, for example?

Mr. Bloom: Yes. We have some information on that alloy. Actually 17-7 PH alloy, precipitation hardening alloy, which contains around 1 per cent aluminum, when it is heat treated in order to give precipitation hardening properties, it is no longer an austenitic material. It transforms by heat treatment into a ferritic alloy, and the consequence of that is it becomes fairly ferromagnetic from heat treatment. Now, if the wire is drawn in the annealed condition where it is austenitic, it will become magnetic quite rapidly, and the increasing magnetic properties are very similar to that of type 301, the 17-7 analysis. We haven't made a specific study of the effect of aluminum in that respect, but I would think as long as the alloy remains austenitic the aluminum might contribute a little bit to the stability of the austenity. Once it is transformed, then of course you have your situation.

A Member: Another question that plagues the wire drawer in this respect is the fact most specifications require tensile strengths in the neighborhood of 300,000 p.s.i. and magnetic permeabilities below 2. Well you say to use an 18-8 stainless steel having nickle content in the neighborhood of 10 per cent; yet you can't get both properties as per the present specifications, or the request in the present specifications. I mean, it is almost impossible to meet magnetic permeabilities in the low range and obtain high tensile properties.

Mr. Bloom: I am very glad you brought that up, because actually one of the purposes in writing this paper was to try to draw attention to the fact that, while stainless steels can be produced with a wide range in magnetic properties and wide range of tensile strengths, the tensile requirements and the magnetic requirements are not always compatible, and that can prove to be quite a problem as you have just pointed out.

You can't always have exactly the tensile strength you want combined with certain magnetic properties, and we were hoping in giving some data on the subject in this paper it would help people who were interested in stainless steels for magnetic applications, and perhaps give us a little bit of a hand in selecting the best material for the job.

A Member: I think the authors have done a very good job in bringing to the attention of people the complexity of this tensile strength magnetic permeability, or magnetic characteristic of stainless wire, and I wonder if they would comment on the AC-DC ratio mentioned in this paper that the Signal Corps has set up on some of their wire.

Mr. Bloom: We were remarking just a minute ago that there were probably going to be some questions come up that could be best met with one minute of silence, and that is one of them. (Laughter) I believe that there is someone here from the Army Signal Corps. Perhaps he would be in a position to answer the question.

A Member: That is a little out of my sphere. It is up to our laboratories to talk about the very controversial AC-DC ratio which has caused me no end of trouble throughout the past year to year and a half in being told we had perhaps the wrong equipment installed at the right place, or the other way around.

I was asked earlier today if some figure of reference had been established for it. I can't say. I sincerely hope that one of these days they come out with a specification that is clean enough for you fellows to be able to follow and duplicate in the field.

A Member: In that last table referring to the speed versus the coercive force, on the right-hand column there, you had practically no change from 200 feet per minute up to 3,000 feet per minute in your coercive force. As I recall it was 160 at 200 and 160 at 3,000. Is there any significance? Have you reached a limit at that point?

Mr. Bloom: That is a rather difficult question to answer. That data we took from Mr. Storcheim's paper. The general effect of drawing speed, of course, is to raise temperature of the wire. We know that these austenitic alloys do not become magnetic as rapidly with cold work as the temperature is raised higher and higher.

Also, it was shown some time ago by Mr. Eberly of the Steel Corporation, I believe, that above a certain temperature those alloys will cease entirely to become magnetic, and the temperature, I believe, is somewhere around 500° or 600° Farenheit, so that under those circumstances it is conceivable that when you get up to a certain point in drawing speed and simultaneously in temperature that you would have a leveling out effect.

A Member: What was the purpose in showing the relationship if there isn't any difference? From 200 feet to 3,000 there should be some difference.

Mr. Bloom: There is a rather decided change in the receptivity figures, and at the lower speeds, of course, the coercivity is changed at 2. One of the points of quoting this data in the paper is not necessarily to explain all of these things. We wish we could explain all of them, but it is more to draw attention to the fact there are a lot of complexities in producing stainless wire with certain magnetic properties, and that, if we are going to do a good job, it is really necessary for us to have more information in the beginning as to what is required in the way of properties in the wire.

A Member: Did you find any relation in this ratio factor chrome minus 16 divided by the nickel? I believe you received the factor of 1.7. Anything below 1.7 would put the alloy to less ferritic, I believe, and above 1.7 austenitic. I think that is reserved there.

Mr. Bloom: The factor you are referring to is the one that Mr. Post and Mr. Eberly presented in their paper a year ago. We have made a number of studies at one time or another of various factors. The problem is this: The change in magnetic properties with cold working in these steels is the effect primarily of the nickel content, but carbon also plays quite a decided part. Chromium content plays a part; magnesium content plays a part; nitrogen content plays a part; and some other elements may also enter into it.

There have been a lot of formulas proposed to try to relate composition to magnetic properties. The formula which was given by Post and Eberly we have tried out and it seems to be pretty good. We have developed a formula which is mentioned in the patent, which also has worked pretty well in connection with magnetic recording wire, but we find very often that when you get right down to the practical fact of the matter you can use the formulas to estimate what the trend will be in a certain direction, but when it comes to getting certain exact magnetic properties you end up

doing it more or less by trial and error method.

In other words, you estimate by the formula about the composition you need, and then you have to nail it down by actually making tests on compositions and vary a little bit.

A Member: One more question, have you studied the effect of annealing before cold working the alloys?

Mr. Bloom: We did some work along those lines in connection with magnetic recording wire, and the data that we gathered several years ago on that did not show any very marked effect where the annealing was carried out at a temperature high enough in order to be sure that we had all the carbides in the material in solution. In other words, where the structure of the material would be uniform.

Now, if you drop down to annealing temperatures which are low enough so that they do not take all the carbides in solution, you begin to find a rather definite effect on magnetic properties, and there is data along that line that is in a patent which was issued to the American Steel & Wire Company where they show that wire annealed at 1.700° F., for instance, will come out with a higher residual induction and lower coercive force than if it is annealed at a temperature of say 1,950° or 2,000° where you have the structure free of carbides.

Chairman Johnson: This certainly turned out to be a very, very interesting discussion and I think both Mr. White and Mr. Bloom are to be congratulated. I am sorry that our time is up. We have had a very attentive audience and we will adjourn to meet again at 2 o'clock.

TUESDAY AFTERNOON SESSION

FERROUS DIVISION

NOVEMBER 11, 1952

The Ferrous Section of The Wire Association convened at 2:00 o'clock, Chairman Joseph R. Carter, Johnson Steel & Wire Company, Worcester, Massachusetts, presiding.

Chairman Carter: Gentlemen, we ought to get started on this afternoon's session.

Personally, I would like to say it is a pleasure for me to be here and be able to help guide the discussions and participate in the program.

The first paper that is to be given this afternoon is, "The Drawing of Weaving Wire," prepared by Mr. Albert Knapp. Vice President and Chief Engineer, of the G. F. Wright Steel & Wire Company, Worcester, Massachusetts. Al Knapp, about three or four weeks ago, suffered an illness and has not recovered sufficiently to be here today. but his paper has been published in Wire and Wire Products for October. He is getting better. He is up and around I understand, and it was his personal request that we hold the presentation of the paper until some future date when he personally could give it. It was suggested that a telegram be sent to Al in Worcester extending our regrets at his being unable to be here and wishing him a speedy recovery. That will be done, from all of his friends here at The Wire Association Convention.

The second paper to be given this afternoon is, "Can Quality Control Be Used in the Wire Mill?" by Mr. Henry H. Passolt, Chief Metallurgist, Johnson Steel and Wire Company, Worcester, Massachusetts.

Mr. Passolt was graduated from the University of Michigan in 1925 with a Bachelor of Science degree in Chemical Engineering and specialized in metallurgy. He worked in the copper and brass mills in Detroit and Bridgeport. In 1927 he became a Metallurgist in the Research Department of the American Chain and Cable, Bridgeport Plant. He transferred to the company's Monessen Plant in 1937 to work for the Page Steel and Wire Division. In 1940 he was put in charge of their stainless steel wire mill and then he became Assistant Superintendent and in 1941 Superintendent of their Carbon Steel Wire Mill.

In 1950 he joined his present company as Chief Metallurgist and just recently has acquired additional duties as Production Manager. He is a pretty busy man these days. In spite of that he has taken the time to prepare this paper, and I am sure we will find it very interesting. Mr. Passolt. (Applause)

Mr. Passolt: Chairman Joe, members of The Wire Association, and guests, when I was approached on the possibility of writing a paper for The Wire Association I had somewhat mingled feelings as to just what I could do to add to the subject of wire processing something that would interest you people and really be some advantage to you. The thought came to mind that I might select something along the line of processing, but in working with wire I realized that it is extremely difficult for anybody to tell anybody else at a meeting just how to do anything, because what you do in your plant and what we do in Worcester, you can describe in the same words but it won't always work.

Now, when you are faced with a proposition like that it is a bit unsatisfactory to get up and describe something. I have been very fortunate in being able to attend some regional meetings of the American Society for Quality Control, and at these meetings I was sort of taken back at the lack of attendance by people in the wire industry. The meetings seemed to be attended in great part by people in industries where they had repetitive conditions of machining, or some such operations, and they set up these charts and controls and seemed to gain a great deal from them.

That got me thinking as to what the difference was between making every foot of wire like the succeeding foot, or making a million bolts just like the first bolt. There were certain principles that I gathered from these meetings that I thought would be of value to point out to the people in the wire industry, because I don't think that people who aren't familiar with quality control really realize the benefits that can be obtained by instigating quality control. In my paper, and here also I am not attempting to tell anybody how to use X bar or chart or any of the mathematical problems of quality control. I don't understand all of them myself, but I do feel that, if anybody will get into quality control and use it, following the principle that is outlined, it can't help but do them some good.

. . . Mr. Passolt read his paper . . .

A Member: I just wonder, Henry, to what extent the wire industry is using quality control? I know our company is using it; since the war it has got into more and more use of it. I would like to give a little evidence in favor of what you have been talking about.

We certainly got a great deal of benefit out of what use we have made through quality control methods. In our company it is handled through our Chief Inspector and handled by the Inspection Department, and we keep quality control graphs of various things that seem to be of importance to us. Just to give one perhaps simple example, in the tinning of copper wire, the amount of tin that is put on wire in a hot tinning operation is entirely a matter of the way the operator works his wipes. He can do a good wiping job, or he can do a poor one, and you can make a tenfold difference in the amount of tin that you use at $1.25 a pound and we have been able to save in just two small tin pans about $20,000 a year by putting in a quality control setup in which we have graphs showing the amount of tin that each of the operators puts on the wire.

This graph hangs up alongside him, and the man can look at what he is doing and compare it with what his buddy is doing, so that puts pressure on him. If the thing goes bad, it puts pressure on the foreman, and, if the thing still isn't corrected, the superintendent puts pressure on everybody and the result is we have reduced the amount of tin on the wire to half what it was before with nothing more than an application of a little quality control.

Chairman Carter: Thank you very much. That is a very good example of what quality control will do. It visualizes the operations and the variances in the operations for the people who are actually doing the operation, or at least have control of the operation, and in this respect it accomplishes the results.

Now I know that there are people that are using quality control. Don't think that I think that the wire industry isn't aware that there is such a thing and that it has value. I know that a number of the companies are using it, but I just felt that the matter of quality control hasn't been brought to the attention of the wire industry and I think any concern, whether it employs a thousand people or ten people, can use quality control to good advantage.

The next paper is, "Significance of the Elongation Test on Wire," to be given by Mr. Howard J. Godfrey, Assistant Chief Engineer, Research and Development, John A. Roebling's Sons Company, Trenton, New Jersey.

Mr. Godfrey was born in Needham, Massachusetts, so I guess we can say that ostensibly this is an all Massachusetts, or New England, program this afternoon. He went to Tufts College and was graduated in 1931 with a B.S. in Civil Engineering. He held a Research Fellowship at Lehigh University from 1931 through 1933 and graduated with an M.S. in Civil Engineering. He was a Research Engineer for the John A. Roebling's Sons Company for three years, left, and for four years was with the Fritz Engineering Laboratory at Lehigh University, and then went back to Roebling's in 1941 as a Development Engineer and has been there ever since.

It gives me great pleasure to introduce to you Mr. Godfrey.

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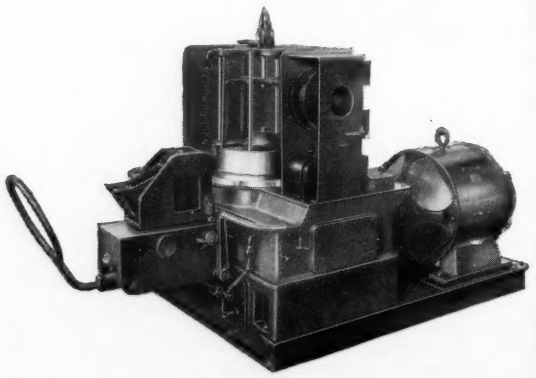

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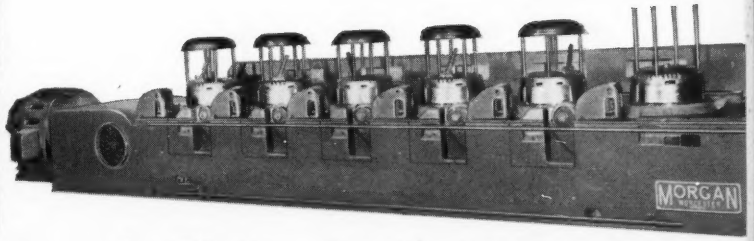

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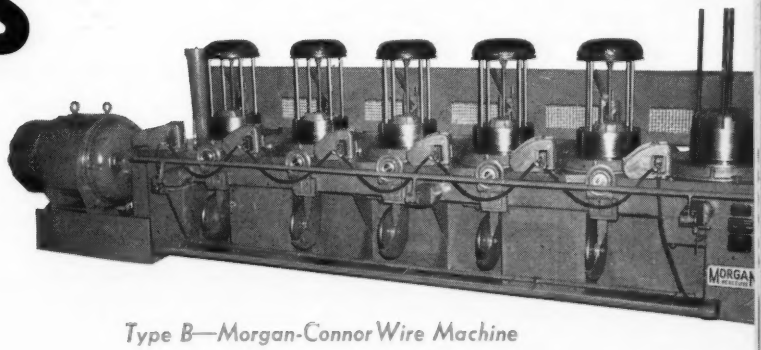

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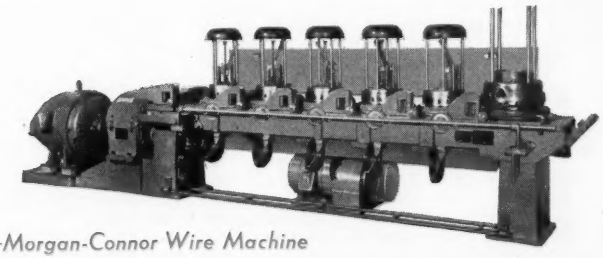

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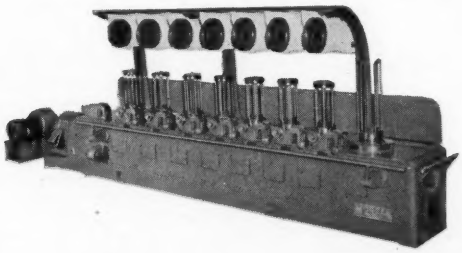
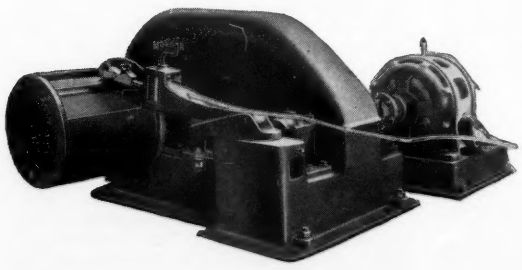


Type F—Morgan-Connor Wire Machine



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. . . Mr. Godfrey read his paper . . .

Chairman Carter: Thank you very much. I am sure we all have a much better appreciation of this elongation, and it was a very interesting approach that you have given us. (Applause)

A Member: I would like to hear more about that ring test.

Mr. Godfrey: If I draw a sketch of the ring test you will have a better appreciation of it. (Drawing). The two rings are interlocked as shown here and the load is applied at the extremities of each ring. If the wire is sufficiently ductile the rings will elongate into a hairpin shape. The efficiency of the test should be from 40% to 50%. In other words, the ring strength should be from 80% to 100% of the strength of a single wire. Fracture always takes place at the point where the two rings are in contact with each other.

A Member: In your paper you mentioned locating that weld.

Mr. Godfrey: The rings are positioned so that the weld is on the side of the ring. In this manner the bending at the welds is at a minimum and failure does not take place at the weld. The rings are pulled by 3" diameter pulleys at each load point.

The severest part of the test is, therefore, at the point where the two rings are in contact with each other. The 3" diameter pulleys should be free to rotate so that the load can be equalized.

A Member: In your tables, Mr. Godfrey, the percentage reduction in area are parallel to the percentage of necking elongation. Wouldn't that be an easier determination of ductility than the necking elongations?

Mr. Godfrey: The reduction of area could be used with equal value as a measure of ductility since the elongation at the neck is computed from the change in diameter at the neck.

A Member: I realize that, but isn't it easier just to determine the reduction in area?

Mr. Godfrey: It is an easier mathematical procedure to compute the reduction of area but the elongation at the neck can be applied directly to other types of deformation such as bending. By using the necking elongation values one can ascertain more directly whether a wire can be bent over a certain radius without fracturing.

A Member: I would like to ask what explanation you give for the fact that galvanized wire gives a longer elongation value than you get from the average elongation value on hard drawn?

Mr. Godfrey: I believe the reason that hot galvanized wire has more elongation is due to the stress-relieving action of the galvanizing operation.

Previous work which we have done has shown that lead patented wire has a greater reduction of area and greater elongation at the neck than air patented wire.

A Member: Along the same line, why does lead patented wire give greater elongation and higher reduction of area than air patented wire?

Mr. Godfrey: The reason for the greater elongation at the neck and greater reduction of area of lead patented wire as compared to air patented wire is probably due to the metallurgical structure. Basically the amount of necking is dependent upon the cohesive strength of the material and we are not certain at this time as to the fundamental factors which influence the cohesive strength.

A Member: In previous work you did years ago, you showed that as you drew lead patented wire, the reduction of area value increased up to about 75 to 80%, and for air patented wire you do not show that same increase.

Mr. Godfrey: No, that isn't quite correct. The reduction of area of air patented wire generally increases with wire drawing up to a certain amount. The behavior of lead patented wire is dependent upon the temperature of the lead. A low lead temperature results in a high reduction of area which does not materially increase with wire drawing. A wire patented at a higher lead temperature will behave in a similar manner to air patented material but the actual reduction of area values will be greater than those of the air patented material.

Chairman Carter: On behalf of those who presented papers, I wish to thank you for your attentiveness. I am very glad to to be here.

WEDNESDAY MORNING SESSION

FERROUS DIVISION
NOVEMBER 12, 1952

The Ferrous Division of the Wire Association convened at 9:30 a.m., Chairman William E. Hitchcock, Jr., Vice President, Atlantic Wire Co., Branford, Connecticut, presiding.

. . . Mr. Gordon T. Spare, Project Engineer, American Steel & Wire Division, United States Steel Company, Cleveland, Ohio, presented his paper on, "Creep and Relaxation of High Strength Steel Wires at Room Temperature." . . .

. . . Mr. H. J. Godfrey presented a written discussion on the paper presented by Mr. Spare, which follows:

The author has made an important contribution to our knowledge of the properties of wire which are of importance in prestressed concrete, and I should like to offer my congratulations at this time.

The methods used in making the relaxation tests are very commendable and these tests are of particular interest because they represent more fully the behavior of wire in prestressed concrete.

Mr. Spare has stated that the users of wire have asked for information on the stability of wire at stresses between 50% and 70% of the ultimate strength. With our limited knowledge of the behavior of wire during a few hours under static loads in the laboratory, it does not seem advisable to advocate the use of wire at stresses as high as 70% of the ultimate tensile strength.

The behavior of wire under dynamic loads over a period of years in a prestressed concrete highway bridge may be somewhat different than that obtained in the laboratory. For the present at least, we believe that stresses should not exceed 60% of the tensile strength of the wire.

In discussing a few specific points in Mr. Spare's paper, I would like to call your attention to Fig. 1, where the plastic part of a stress-strain curve is presented. The author has stated that the stress-strain curve was virtually the same whether it took one minute, 10 minutes or 100 minutes to stress the sample to 200,000 p.s.i. (.01 in./in.). This statement is debatable and should not infer that the amount of creep will not be affected by the rate of loading, since the creep curves in Fig. 2 of the paper show that a large percentage of the creep takes place in the first 60 minutes of loading. For a true comparison of creep properties, therefore, the rate of loading should be approximately the same.

Fig. 5 illustrates the creep properties of various types of wire and has included wire which has been stress-relieved by two widely different treatments. The large difference in creep on these two materials indicates that the time and temperature used for the stress-relieving operation have considerable effect on the creep properties. The question therefore, as to the relative merits of stress-relieved wire and as-drawn wire will depend on the thermal treatment used.

In addition to the changes in physical properties as a result of the stress-relieving operation, the bonding properties of the wire are improved because the wire drawing soaps have been removed to a large degree by this treatment.

As pointed out by the author, all cold drawn wire has been subject to a time-temperature treatment due to the heat of wire drawing. It has been found that if mechanical straightening methods are used on cold drawn wire, a large increase in the amount of creep will be observed unless it is followed by a suitable time-temperature treatment.

In Fig. 7 the author illustrates the effect of coil curvature on the creep properties of wire. We would be interested in making a similar study and would like to be advised as to the method used in obtaining the variations in coil curvature.

Mr. Spare's findings in regard to the relation between creep and relaxation are of great interest. It might be assumed that the amount of relaxation would be relatively less than the creep but apparently this is not correct. I am very glad to report that we have also found this same relationship between creep and relaxation as reported by the author and we are appreciative of having the opportunity of comparing results.

In conclusion I wish again to congratulate Mr. Spare for his timely and informative paper.

. . . Mr. E. S. Tyler, Metallurgist, Atlantic Wire Co., Branford. Connecticut, presented his paper on, "Salt vs. Atmospheric Annealing." . . .

Chairman Hitchcock: Thank you very much, Elmer, for your interesting talk.

I knew we had a few people write and tell Mr. Tyler that he'd better be prepared to answer a question or two on how to remove or prevent smut from wire. Jim Whitten called the other day and said you better be ready. You may have to defend yourself because the paper is going to include the name of the company, so perhaps to start off I will ask Jim Whitten if he has any comments to make.

. . . Mr. J. L. Whitten presented his prepared paper on, "The Problem of Clean Wire Annealing in an Atmosphere

Controlled Furnace." . . .

At least 75% of the wire annealing furnaces which our company has built have been sold for bright annealing operations.

This term "bright annealing" was meant to convey that the wire being annealed would be free from scale if heated and cooled under an inner cover and which was filled with a protective atmosphere until the charge was uncovered at around 250 to 300°F.

The term was also meant to convey that the wire would be bright; that is, it would be silvery in appearance because it was not oxidized, but, in general, there never has been a clarification that the matter of the brightness of the wire would have to be qualified by the kind and amount of coating that was on the wire when it was charged into the furnace.

The resultant appearance of the wire after annealing is very definitely a function of the kind and amount of coating used for drawing lubrication, as the wire can be brought out of the furnace scale free and bright, but possibly bright under a coating of smut or carbonized soap which has been used as a drawing compound, particularly on the heavier gauges of wire. All users of this kind of equipment are also familiar with how bright and clean wet-drawn wire or the smaller gauges of wire can be after annealing and there are some present who manufacture "glass wire" and know how clean and bright this wire can and must be for use in placing within molten glass sheets.

There is no magic way of producing bright wire and clean wire except by a lot of care and attention to the method of processing. In the usual wire plant where there is little segregation of coil size or gauge size on the annealing bases, there is bound to be alternate charges of heavy gauge, heavy coated wire and lighter gauge, thin coated wire so that all bases and inner covers are bound to get a good dosage of smut deposit and, of course, this is on the wire spiders also. Part of this smut is volatile and will vaporize on the next charge and recondense as the charge cools so that once the inner cover inside surface and the base castings and other parts have gotten a good coat of this smut, it is going to be transferred to the next number of charges and if nothing else is done about it, the problem is a chronic one.

Undoubtedly, the present audience will all recall that when their annealing equipment was new and for some months thereafter, they were all pleased with the brightness and cleanness of the wire coming out of their atmosphere controlled furnaces. During the heating process, the wire coating was largely vaporized and a considerable portion of it was carried away mechanically by the atmosphere, but not all of it, unless the local conditions permitted the use of a great deal more atmosphere gas per base per hour than is usual. Gradually the smut on the inside of the covers and other related places builds up to the point where it makes the finished condition of the wire after annealing unsatisfactory for further cleaning operations; although we have experiences where the operators actually were trying to get a heavy carbon smut on the wire as it makes an excellent lubrication coating for direct drawing after bright annealing.

In some plants where it was a very vital necessity to obtain bright, clean wire after annealing, we have been able to impress on them that the annealing operations and equipment must be segregated so that only a certain number of bases would be used for this very bright and clean product and the wire with the very heavy coating would never be put on those bases for annealing. This suggestion has had very successful results after it was combined with a thorough clean up of the equipment which involved:

1. Brushing the carbon from the inside of the inner cover face surfaces and then finally removing it by washing these surfaces with carbon tetrachloride.
2. Thoroughly cleaning the spiders and base castings by pickling to remove the smut and any scale that might have collected on them.
3. Thoroughly cleaning the base of any scale or smut that has collected on the brick work.
4. Cleaning out the oil seals to make sure that the oil in the seals is free from a heavy mixture with water.

The discussions under point No. 3 above bear a further comment to emphasize the impossibility of getting clean bright wire if the bases are to be used alternately for black annealing and for bright annealing. The black annealing charges will leave a deposit of scale on the spiders and base castings, if steel—not alloy, and drop a considerable quantity of scale from the wire onto the brick work. If the next charge is a bright annealing charge, these scale deposits will be reduced by contact with the CO and H_2 portions of the atmosphere gas which will release oxygen which may not itself discolor the wire, although it may not be present in such quantity to do so; but it is more likely to cause a re-arrangement of the gas equilibriums in the atmosphere with a resultant carbon throw down, which is often attributed to burned soap coating on the wire. If the process is one of annealing high carbon materials, this re-arrangement of gas equilibriums may cause a decarburized product. This is mentioned merely by way of indicating that this oxide reduction is a known chemical reaction. Many decarburizing problems have been solved by the elimination of scale on the spiders, brick work and castings.

There have been some notable developments recently in the way of producing clean wire that should be called to your attention. In one plant where our equipment is used, in an attempt to remove this smut from the wire during the annealing process, they tripled the volume of atmosphere gas above their normal usage. This produced the necessary additional mechanical conveyance of the carbon to carry it out of the furnace so that the wire was bright enough to be galvanized after it left the furnace where it had been a hit and miss matter before. This company acted on their solution of the problem by the purchase of additional generating equipment to provide a larger volume of gas required so that the results on one set of bases could be and was duplicated in their entire annealing department. An interesting figure that developed from this is that the amount of atmosphere gas required per base for this purpose would vary between 300 cu. ft. per hour for a 48″ base to 500 cu. ft. per hour for a 74″ base. Perhaps we, as suppliers of this equipment, have not insisted on large enough atmosphere gas plants, but our future recommendations will be based upon the above figures. Here, it should be commented that the exothermic type of gas resulting from partial combustion of the fuel, which produces a gas with approximately 22% combustibles, will do a much better job of clean annealing than will the high nitrogen gases where the combustibles do not exceed 10% and are probably lower. The action of these nitrogen gases is largely limited to mechanical conveyance and if that atmosphere is to be used in the annealing process, some consideration should be given to even larger quantities of gas per base than was mentioned above.

We must also note some of the very peculiar results in gas equilibrium and carbon throw down which occur as a result of the gas dewpoints not being held to low enough levels as a result of incorrect operation of refrigeration or drying equipment. The Exothermic gas should be delivered to the furnaces at dewpoints around plus 45°F, while the nitrogen gas should be delivered to the furnace at around minus 40°F or lower. If something has happened to the drying equipment which allows the gases to be wetter than indicated, a smut deposit is one of the things that is going to result from the failure of this part of the equipment.

With the larger volume of gases to be moved through the bases, some examination should be made of the size of the exhaust lines or perhaps of the supply lines also as both may have to be increased in size to carry the gases in and out of the base. If there is enough gas to carry the smut out of the base, a lot of this will condense in the exhaust pipes so these pipes should be provided with drip legs for frequent draining and they should also have an occasional blowout with compressed air, or possibly steam, so that they do not become clogged and interfere with the gas flow.

All of this could be summarized up in one or two words and that is recognition of the problem and proper maintenance. If the above program seems onerous, let it be remembered that if the charges are segregated between heavy and light wire the bases used for light wire will hardly ever need any cleaning. The bases used for the heavier gauge wire with heavier coating, if given a thorough cleaning two or three times a year, will deliver, for the most part, what is required. Nothing sweeps like a new broom and too often the maintenance required drops off as the newness of the process disappears. However, the maintenance costs per ton of product produced will be lower with atmosphere controlled annealing than any other annealing process and the efforts exerted in that direction will pay off in a big way. Bright annealing is just like any other process or business, it takes some everlasting looking after to get results.

Chairman Hitchcock: Thank you, Jim. Are there any questions for Mr. Tyler on salt annealing?

A Member: There is one point you must have covered in salt annealing wire; that of making sure that the wire is cleaned thoroughly after salt annealing to prevent corrosion.

Mr. Tyler: Yes, I mentioned at one point, as I recall, that that wire could not be readily stored without cleaning and liming or otherwise protecting it. The longest we let any of that wire lie in the mill without cleaning is from 11 o'clock on Friday midnight until about anywhere from one to three in the afternoon of Monday. In other words, everything else is cleaned the same day or the day after it is annealed. Of course, with bright annealed material, too, if one is going to use it for further processing, it is advisable not to let it lie around too long, because it will rust readily.

A Member: Do you ever have any problem of coil distortion?

Mr. Tyler: Yes, we do; I think probably everyone using salt does in general. We don't have much trouble with the 26 inch diameter coils or the medium rim, 22 inch diameter coils, although a few of the smaller gages that are occasionally run in 22 inch coils do tend to give us some trouble.

We have what we term special yokes, which support the top of the coil, and also two spreader bars at the bottom, which support the lower portion of the coil, and we have a similar arrangement that we use on the 16 inch coils to prevent distortion of the coil, but in general, we have less trouble with that on the low and medium low carbon material than we do on medium or high carbon material.

Our final speaker on the program is Mr. William D. Bawden, Works Manager of Gilbert and Bennett Mfg. Co., Georgetown, Connecticut. Mr. Bawden presented his paper, "Design of a Galvanizing Furnace." . . .

Chairman Hitchcock: Thank you very much, Bill, for that interesting discussion of your galvanizing furnace.

A Member: I wonder if you could give us some information regarding the thickness of the side wall of the pan.

Mr. Bawden: That was one thing not mentioned in the paper, resulting from an attempt to keep it short.

There are two things to consider on the thickness of the pan, one is the capacity of metal in the pan and the second, which you will see published in the paper later on, is a chart showing that the length of the sides has a great deal to do with how thick that pan should be. When those two factors were taken into consideration the decision was made to make our pan an inch and a quarter thick; we chose the one that showed the greatest thickness.

A Member: I was interested in the remarks concerning the dross. It is a subject that we have been into in connection with galvanizing wire, and I was surprised that you said about six per cent comes from the pot itself. We wondered how much came from the flux; if there is any iron in the flux itself carried over which will result in dross.

We measured the drag-out from the flux pan and determined exactly how much iron in the form of iron salts was in the pan. Then we figured that out on the basis of four per cent zinc and six per cent iron in the dross and we came out with a figure of fifty pounds of dross per week coming from the flux pan. That was such a small percentage that it was almost negligible, so we therefore concluded that practically all of the dross came from the pan itself or else from the solution of the wire in the zinc.

If you give that consideration, the zinc is always saturated with iron; it is just like any solution of salt and water. If you have free salt down at the bottom of the water you have a saturated solution which will depend upon the temperature. If that is true, then, it is really difficult to see why any of the zinc on the wire will go into solution, any of the steel on the wire would go into solution in the zinc, if we already have a saturated solution. Then, the next question is how does the pan go into solution, and the only way the pan can go into solution is if the surface of the pan itself is hotter than the average temperature of the zinc and therefore the solubility of iron and zinc is higher because of the higher temperature of the pan surface; in that case we have a higher saturation value for the zinc and some of the pan will go into solution, and then when circulation takes place and the hotter zinc from the surface of the pan moves to a colder area, then you will have a supersaturation and some of the iron will come out of the solution in the form of dross.

That was the conclusion that we reached as to the formation of dross in the zinc pan, but it is mainly from the pan itself and was principally due to the surface of the pan being at a higher temperature than the zinc. That doesn't fit in with your figures.

Mr. Bawden: I was going to make a further explanation of that six per cent figure because I think it is misleading.

We know that in our zinc bath the amount of iron that is in solution, we have run tests on it after drossing the pan, after running it for a whole week, and we find that after drossing a pan and allowing it to settle and then running the pan for a whole week, that our difference in the amount of iron in solution is about five-tenths of one per cent.

Now, the six per cent figure is misleading in this respect: We took the three hundred pound loss of metal that we had on the pan and if we absorbed three hundred pounds of hundred per cent iron, and it takes a long while to absorb that three hundred pounds, because actually the six per cent of the material found in the dross is not all from the pan. In other words, one and two-tenths pounds of the twenty pounds of dross per ton of zinc metal is all that came from the pan itself.

I say that the six per cent we considered in that light gives you quite a different impression, yet it is misleading, I know.

Two other things not mentioned in the paper, from a combustion standpoint, we figure these furnaces are operating at between sixty-five and seventy per cent efficiency. Now, that test has been taken from combustion, or analysis of the flue gases and it checks pretty well with some other figures we found over a period of one year in operating these furnaces.

We have set up a system whereby we know how much oil we burn. We know how much material goes through the furnaces so that it is very easy to calculate to determine how many B.T.U.'s we burn in a furnace per hour and one figure that we will come forth with when the paper is published is what it takes to operate this furnace over a period of one hour. That figure is 1.7 gallons of oil per hour.

There is another point I would like to bring up and that concerns something we have found in checking these furnaces. They are designed so you can't overload them. We have tried on one of the furnaces to see at what point the furnace would start to lose heat and not recover fast enough. We calculated a ten per cent safety factor and ten per cent of two thousand pounds per hour gives us 2200. We ran a test some time ago in which I could get 2230 pounds of production per hour through the furnace and still maintain a zinc temperature of 834°.

A Member: What experience have you had in repairing that pan? You have a pretty sizable piece of capital investment there; it seems that you should be able to repair that.

Mr. Bawden: We have not repaired that pan as yet and one reason is that we are going to put a patch on that pan, cut out a section where it was worn out and replace that section so we can put the pan back in use.

A Member: Will you weld that section?

Mr. Bawden: Yes.

A Member: In electric welding, what will be the reaction of the hot part and the zinc that is absorbed with the remaining metal in the pan? Are you going to have a joint or not?

Mr. Bawden: We have to have a joint there, but it is not going to be a patch. It will be a section cut out and replaced with the same material; the material used in the pan is firebox steel in this case. Whether it will work or not we do not know.

I might say that we have been very fortunate in the way the furnaces are constructed. Only two of them have gone out in a period of five and a half years and in each case it didn't take us one hour's time to repair the furnace. The bottom chamber of the furnace is so designed and the porthole is big enough to allow the zinc to run right out in the pit. We have had no zinc accumulate in that bottom pan whatsoever.

I would like to thank you, Bill, on behalf of the group here, for your excellent presentation.

TUESDAY MORNING SESSION
NON-FERROUS DIVISION
NOVEMBER 11, 1952

The Non-Ferrous Division of the Wire Association convened at 9:30 a.m., **Chairman Willard DeC. Crater,** Assistant Manager, Vinyl Sales, Naugatuck Chemical Company, Naugatuck, Connecticut, presiding.

Mr. Whitney: Gentlemen, will the meeting please come to order.

I want to welcome you to the first non-ferrous meeting of this 1952 Wire Association Convention.

This year we have departed to quite an extent from previous programs, in that we have devoted both sessions of today's convention in the non-ferrous section to insulated wire and insulating materials. We believe that that will be of particular interest to many of the

wire users, and we believe that we have a very interesting program for you, but the success of this program depends not only upon the papers that are presented, but upon an active discussion afterwards, and we want to urge every one of you that has any questions or any further information that is desired, to feel free to ask your questions at the conclusion of the papers.

I will turn the meeting over to Mr. Crater, who is chairman of this section. Mr. Crater.

. . . Applause . . .

Chairman Crater: Welcome, gentlemen. We are very fortunate this morning as our leadoff man to have Kenneth Busse, who will give us a paper on glass fibers.

Ken has had considerable experience as a chemist previously in the pulp and paper business. He is now sales manager of the Micro Fiber Division, Glass Fibers, Inc., and I will now turn the meeting over to Mr. Busse.

. . . Mr. Kenneth J. Busse presented his paper, "Glass Paper as an Electrical Insulating Material." . . .

Mr. Busse: I could talk further about the quartz fibers, but I think this has been a sufficient introduction for inorganic papers, and I will now open the meeting to questions.

A Member: What is the name of that paper company again?

Mr. Busse: Hurlbut Paper Company, South Lee, Massachusetts.

A Member: Do you know the dielectric strength of the paper such as the one of which you tore the corner?

Mr. Busse: I know that some of the papers produced by Hurlbut have dielectric strengths up around 300, but just which type it is, I don't know definitely. It is 320 volts per mil, actually.

A Member: What is the cost of the paper per pound?

Mr. Busse: I don't know exactly what Hurlbut charges, but the type of the fibers range anywhere from $1.18 a pound on up to $17 a pound, and the paper mills use fibers that range around $5 a pound, and they have about a dollar or two markup, so their papers probably sell for $7 a pound. But the thing to remember about a glass fiber vs. organic paper is that you can produce from four to five times the number of square feet of an inorganic paper as compared to organic paper.

A Member: Do you know of any particular government specification against which this is being evaluated at the present time?

Mr. Busse: I am sorry, I am not familiar with any specifications to date. I imagine the paper mills and the middlemen would know.

You see, we just sell the bulk fibers. The middlemen who make the specific product probably are up on that.

A Member: How extensively is this paper being used in the textile field as for motor insulation or transformer insulation?

Mr. Busse: At the present time, all glass papers are just being tested. There is actually no big usage of the glass paper, as yet.

All of these products shown you have been produced inside of the last six to nine months. The Hurlbut Paper Company claims they have their glass papers being tested for over 100 different uses, but that is where it stands now.

A Member: What is the airflow method of measuring the diameter of these fibers?

Mr. Busse: It is airflow over 100 square centimeters measured as resistance in millimeters of water, and it is an accepted airflow method for determining diameter of an air file.

Chairman Crater: I have a question myself. Has any work been done on metallizing your paper such as you metallize paper for use in various electrical fields?

Mr. Busse: The Minnesota Mining & Manufacturing Company have been doing some work, but most of that work is being done in Antwerp, Germany. In fact, they claim they can coat on both sides with a silver alloy to give an all-metal silver paper.

A Member: Is there anyone making a glass paper serving tape?

Mr. Busse: No, not that I know of, just this tape here, and this was actually for coil.

This paper is actually premature for final usages, but it gives an idea of what is being done to get everybody thinking in the general direction of where an inorganic paper with the properties as glass and quartz, of the characteristics they have as used in the electrical insulation, air filtering, and laminating fields.

Chairman Crater: After that paper, if there are no further questions, we will go on to the next.

Chairman Crater: The next man to come to bat is Mr. Vincent McBride, who is Chief Engineer of the Plastic Wire and Cable Corporation, Jewett City, Connecticut.

Mr. McBride has had considerable experience in wire and cable engineering, and he is going to tell us about the use of plastics, some of the newer constructions that have been made.

His paper deals particularly with special type of barn cable. Mr. McBride. (Applause)

. . . Mr. Vincent McBride presented a paper on "The Development of Improved Electrical Wiring Materials." . . .

. . . Applause . . .

A Member: Do you put any kind of coating on that glass receiver or just a dry glass receiver?

Mr. McBride: Just a dry glass receiver.

A Member: Why do underwriters require that your cable meet a 300 per cent overload?

Mr. McBride: Well, the underwriters, of course, realize the basic features of thermoplastic materials, which are that they are affected by temperature. The properties at higher temperatures involve softening; at lower temperatures hardening. Now, that varies depending on the compound and the construction features. As such, they fear the possibility of conditions in the field and have to worry about this creating true short-circuit or other abnormal conditions. Temperatures which would sufficiently damage thermoplastic materials could create actual fire hazards, and so they search through the code and all other sources of information to try to arrive at some value which would represent a rather maximum of field expectancy.

A Member: They must assume improperly fused circuits?

Mr. McBride: Well, no. Frankly, No. 14 wire ordinarily fused at 15 amperes is, in one table of the code, permitted to be fused at 40 amperes for certain starting current, certain type of motor, so 45 amperes, which is only slightly above at 40, is 300 per cent of the 15 normal rating. You see, it isn't too far out of line.

A Member: What low temperature test do underwriters require on this cable? You say that it is recognized for temperatures down to 40 degrees below zero F. What test requirement is attached to that?

Mr. McBride: Actually there is only a minus 10 degrees Centigrade test on a non-metallic sheathed cable, but the situation we ran into early in the development of this was that they were set up where they need these cables up in Minnesota; they have very low temperatures and they are not satisfied with the thermoplastic Type T and TW they have seen to date, so we realized that something a good deal in the way of below zero temperature was necessary.

The first practical test was to send some of our cable up to Minnesota, and at 40 degrees below zero, a contractor kicked it around and tied knots in it and so forth, and he was satisfied.

The underwriters' inspection test is only minus 10, but we have asked the underwriting inspector of the Comstar plant to perform also, so that at minus 40 we can be sure of maintaining the proper properties in our cable.

A Member: Will the cable stand, for example, a 500-foot coil being dropped to a concrete floor at that temperature?

Mr. McBride: That is one of the tests. Now, the armed services are talking of minus 80 dropping packages on the floor. I don't know where they'll find that, but that is what they are thinking of.

A Member: Do you feel that this type of A-Z cable will eventually replace the standard fiber-covered non-metallic sheathed cable? What is the trend?

Mr. McBride: Perhaps eventually. At present it is a premium priced cable for special applications where other materials are not suitable, but I think that will resolve itself ultimately.

A Member: How much non-metallic sheathed cable is used per year?

Mr. McBride: Well, the volume has really been quite startling. About four times as much non-metallic sheathed cable is used as the metallic sheathed.

People in the cities are accustomed to seeing the BX cable around most of the time, but out in the sticks and over the country at large, the non-metallic is more commonly used.

The volume of non-metallic sheathed cable, I believe, runs upwards of a billion feet a year.

Following the publication of Mr. McBride's paper a reader sent in the following quotation from The Inspector's Bulletin of The Minnesota Electrical Inspectors Association, taken from No. 1, Vol. 9, 1948, requesting that it be printed as a commentary on the subject.

"The Rome Cable Corporation has developed a new barn wiring cable to replace the commonly used cotton jacketed nonmetallic sheathed cable which has failed to stand up in buildings housing

livestock. This new cable contains no cotton or paper to absorb and hold moisture. The individual conductors are insulated with 1/32 inch of Type R rubber covered with 1/64 inch of neoprene instead of a braid. The two conductors are then paralleled and covered with a jacket of 1/32 inch of neoprene. One conductor is identified by using white neoprene for the jacket replacing the braid.

"Even though it has taken twelve years for us to get this new wire, we are happy to know that our efforts have at last been rewarded. We feel that the Rome Cable Corporation are to be commended for their willingness to listen to our pleas and then produce at such a reasonable cost the material needed so badly on our farms."

Chairman Crater: We have our next paper, which is a joint paper on new developments in the asbestos insulated wires. The paper is to be presented by Mr. Robert Peck, who is with Johns-Manville in the Boston territory of the Industrial Products Division. Mr. Peck is an MIT graduate.

The co-author of the paper is Mr. Edward P. Hall, who is metallurgist and wire engineer of Kennecott Wire & Cable Company. Mr. Hall is also a member of the Magnet Wire of NEMA. I believe he attended McGill University.

. . . Mr. Peck presented a paper on "Development of New Asbestos Insulated Magnet Wires." . . .

Mr. Peck: I would like to say that we have here Mr. Hall of the Kennecott Company, who has done 90 per cent of the work on this. He does the work and I do the talking, which is a very nice combination.

We also have Mr. Green from the Dupont laboratory and Mr. Reddin from Johns-Manville, so I think if you have any questions about any of the materials or the combinations, we can probably give you some kind of an answer.

A Member: Has there been much done in this application other than on magnet wire?

Mr. Peck: Yes. Obviously, being from Johns-Manville, I am not so interested. You mean the application of asbestos for other than magnet wire?

A Member: No, in this Quinterra and other combinations?

Mr. Peck: Yes, there has. I will take back what I just said. I thought the question was different.

There is one tremendous application of the material on cable. The Navy cable, with which some of you may be familiar, is now being insulated pretty much completely with a material called Glassterra, which is two four-mil layers of Quinterra with the glass threads between them, adhered in a sandwich, thereby getting the advantage of the asbestos insulation plus the tremendous strength of glass. The asbestos by itself just won't run.

There has also been an application in the magnet wire field, but not with asbestos, which I thought you first spoke of, and that is replacement by Dacron over Formvar, which has seemed to have had a tremendous past.

I think Mr. Hall can probably say more about that. Ed, do you want to comment on Dacron over Formvar?

Mr. Hall: Well, our thought in using the construction of Dacron over either Formvar or enamel was this: that neither Formvar nor enamel are in themselves Class B insulations. Formvar approaches it. You put glass and silicone varnish over it—at least glass and varnish—and it doesn't seem necessary to have a thoroughly heat-resistant material over one of a low temperature range.

Your Dacron over Formvar seems to have these advantages. It gives an extremely smooth wire. It gives you a better space factor than you can get with glass and varnish, and we believe it can be produced at a somewhat lower cost.

That is the main advantage of the combination of Dacron over either enamel or Formvar.

A Member: How fast are you able to apply Quinterra, such as used in your operation at present? What is the speed of your head?

Mr. Hall: I can give you the pull-out speeds of the machine. They will range from about 12 feet up to somewhat over 20, and you can run it possibly as high as 25 feet.

Mr. Peck: I might say we haven't really paid much attention to the rotating speed of the head because the pull-out speed is the economic consideration, and we can't do too much to control the rotating speed. It, of course, is dependent upon your pull-out speed.

A Member: If you get 25 feet per minute, how wide a tape do you have to use?

Mr. Hall: There, again, the width of the tape is important. On a quarter-inch tape, your pull-out speed wouldn't be more than 10 or 12 feet a minute.

As Mr. Peck just said, that is really governed by the speed of the wrapping head. If your pull-out speed is too high, then your wrapping head is running too fast. So far, we haven't been able to entirely control tensions on it.

It is our hope that eventually we will be able to get Quinterra put up in universal-wound packages, and it will be easier to apply it from that package than it is from the pads. With the wider width tapes, we still run from pads.

Mr. Peck: The breaking point on the tapes is where it comes off of the pads onto the wire, and that is what determines our pull-out. I didn't mean that we couldn't figure the rotating speed. It is just that the changes on this machine are in the pull-out speed, so what we did was to build up our pull-out speed until it started breaking and then if we got breaks we came down on the pull-out speed. We found, however, the big difference there was in the operator.

A good, experienced operator will be able to run it faster than a man just starting out, and the biggest obstacle to overcome in this is the man who has been used to a strong paper tape. He takes one look at the Quinterra and shudders and screams. They will do it every time. Some of them are doing it a month later.

A Member: I would like to ask a question about the last slide, in which you indicated the Quinterra and Mylar combination.

You had two layers, butt jointed with 50 per cent registration. Is that actually four layers there, one of Quinterra, one of Mylar?

Mr. Peck: Yes. Each layer is a combination insulation of three mils of Quinterra adhered to a half mil of Mylar, giving you a total thickness of each tape of 3½ mils, or a total thickness of both tapes of seven mils.

A Member: Then, those are both wound in the same direction rather than in opposite directions?

Mr. Peck: We wound everything in the same direction.

A Member: Would that be more advantageous than winding it in opposite lays?

Mr. Hall: With the machines we have been using, we only applied tape in the one direction. Now, that is another possibility, of course.

A Member: Do you believe that you would have decreased characteristics by having them opposed to each other, where, at each butt joint, you would have places where you would have opened or partially opened interstices?

Mr. Hall: Essentially you have only the insulation of one tape with a butt joint construction.

You can get very similar dielectric properties by using a single tape with a lap joint.

Mr. Peck: Can you put Slide No. 7 on again? I think this will illustrate one thing Mr. Hall said.

Mr. Peck: Let's take Nos. 4 and 5 here. One is a double Quinterra construction, one is a single Quinterra construction. The Quinterra is always put on butt lap with a 50 per cent registration, two layers. Your single Quinterra is a one-layer with about anywhere from 10 to 25 per cent overlap, and you will notice out here you are getting the same dielectric strength.

That just happened to come out exactly the same, but it usually comes out roughly the same. So that what we believe you are getting is insulating value of one thickness of tape, whether you apply or whether you get your one thickness by putting two so as to hide the butt lap of the lower one or whether you just use one and overlap it.

A Member: That was the point of my question. If you put them opposed to each other on each side, or each side of the conductor, or continuously, you will have places where the two butt joints intersect.

Mr. Peck: Well, I would not think it is as good, but we have not tried it.

Mr. Hall: Based on paper insulation, we wouldn't think of applying them in opposite directions.

Multiple layers are always applied in the same direction.

A Member: Do you use an adhesive on the wire with this type of construction?

Mr. Hall: Not with the Quinterra-Dacron. With Mylar it would be necessary to use an adhesive.

A Member: Does the Quinterra not adhere to the wire?

Mr. Hall: No, although it adheres rather firmly when you cover it with Dacron.

Mr. Peck: We tried a great many experiments with and without sticking it with varnish, and we think we get better bendability without it.

It would be a question of whether to stick the Quinterra, which would reduce the bendability of the wire, or whether or not not to stick it.

From our tests to date, which have been rather extensive, we left out the

adhesive and you get a better bendability with the same construction. That was the main reason for not using the sticking varnish.

I think Rockbestos is the only one who has successfully applied Quinterra to tapes without reinforcement to the wire. Am I correct on that?

A Member: Do you have any recollection of what the maximum operating temperature would be of a Quinterra-Mylar combination insulation?

Mr. Peck: We don't know. We know Quinterra can operate and keep its physical stability well above 400 C. I don't know about the Mylar, but maybe Mr. Green could add something to that. Jack, do you know anything about it?

Mr. Green: I don't know much about the Mylar end of it. Frankly, that is a different field, and I have very little contact with it. I am more concerned with the Dacron alone.

Chairman Crater: While you are here, Mr. Green, although you are not completely familiar with the Mylar film, I think this group would be interested in Mylar as a new product with Dupont. You can give us a fast rundown on its commercial availability today and its price. It would be helpful.

Mr. Green: Mylar itself, of course, is the Dacron film. In other words, it is extruded in a film form, and Dacron and Mylar both at the moment are in a very limited supply.

We are more or less in a pilot plant operation at this particular time. We do hope to be in much fuller commercial production by the middle of 1953, at which time our first plant will be completed and in operation.

And price-wise, I can't quote you Mylar prices.

Chairman Crater: Well, I think this is true: you will have Mylar film that will be available down to probably a quarter of a mil, is that correct?

Mr. Green: We certainly expect it.

Mr. Peck: We have been in touch with other departments of Dupont, and they tell us that one of the reasons they haven't done too much with Mylar until recently is its availability is apparently considerably less than that of Dacron.

Am I correct, Jack, in believing you are going to have Dacron available about June or July?

Mr. Green: We expect to.

A Member: What thread system are you using with Dacron? Are you using the linear single nylon or are you using cotton count or fiberglas count?

Mr. Green: At the present time in basically the same form as Nylon. We are making it in filament form, 40 denier, 70 denier, and 200 denier, and most of the poundage we have been able to manufacture at present, bearing in mind we are very limited, has been three denier. However, we hope eventually to get into one and one-half and six, and we are also making it in tow form, and that has been roughly 380,000 denier tow.

Chairman Crater: Thank you very much for a very excellent paper.

TUESDAY AFTERNOON SESSION
NON-FERROUS DIVISION
NOVEMBER 11, 1952

The meeting convened at 2 o'clock, p.m., Chairman James E. Flood, Chemican Engineer, Pastic Wire & Cable Co., Jewett City, Connecticut, presiding.

Chairman Flood: We will please come to order, gentlemen.

Our first paper is by Mr. Marty G. Caine, Assistant Sales Manager, Plastics Division, Monsanto Chemical Co., Springfield, Massachusetts. His paper is "Dry Blending for the Vinyl Extrusion Industry." (Applause)

. . . Mr. Caine presented his prepared paper on, "Dry Blending for the Vinyl Extrusion Industry." . . .

Chairman Flood: We are now ready for the questions.

A Member: Do you feel there is any one best method of doing compounding of this sort?

Mr. Caine: No; I don't think there is any one method that will satisfy everyone's requirements. A technical analysis of each individual operation will have to be made before the proper method can be chosen. From results of tests that we have made, we just don't find any one method which seems to give a superior product over that of another method. However, the size of the operation and the type of products to be made will generally determine the type of equipment that will finally be chosen.

A Member: You have given a maximum of plasticizers of seventy-five per cent. What is the minimum amount of plasticizers you can use and come up with a satisfactory dry-blend?

Mr. Caine: Zero.

A Member: That means you can make it rigid?

Mr. Caine: Actually, we have made dry-blends using no plasticizers.

A Member: Using fillers?

Mr. Caine: Not in the sense of the word. We use inert material, and I suppose it could be considered as fillers. There were stabilizers and other materials used. Actually, there was no plasticizer. I don't think it is a method that is used in the industry, but experimentally it can be done.

As far as elastomeric formulations are concerned in our actual operation, we have gone to twenty-five parts of plasticizer to one hundred parts of resin without any difficulty.

A Member: Will you elaborate on that subject of preheating the dry blend before extrusion or during the extrusion process?

Mr. Caine: There are several suggested methods of preheating, one of them being electronic, and there are various other mechanical and radiation methods that have been used. Regardless of the type used. one paramount thing must be adhered to, and that is that a uniform temperature must be fed to the extruder at all times. It doesn't make much difference what that temperature is as long as it is uniform.

Electronic preheating methods have not proven out to everyone's complete satisfaction. On some limited trials, they have given as much as one hundred per cent increase in extrusion rates. However, the cost of the electronic equipment will buy an electric extruder, and in many cases, an extruder and a half. So whether or not it will be worth while using is another matter.

There are radiation methods, infra red heating, Kel-rod units, which all can be used to advantage, or, the preheated blend may be fed directly from the dry blender to the extruder provided you maintain a uniform temperature.

A Member: You mean the hopper is kept heated and thereby the heat is transferred to the dry blend?

Mr. Caine: No; that is a method under consideration, but has not been proven completely as yet. Hopper heating methods are being investigated at the present time, but there has been some difficulty in the handling of dry powders in such methods. They handle very easily with the granular compound, but not completely so with dryer blends, although a manufacturer of the equipment is working on it at the present time.

A Member: You mentioned in the early part of your discussion that you should put the resin in the machine first, then the plasticizer, and then the dry powders. Some of our earlier work indicated the reverse was true.

Why do you set that up as a preference rather than the dry powders first.

Mr. Caine: Well, we found by varying the order of materials, namely, putting the resin in first and then the plasticizers, when the mix is substantially dry, it greatly reduces the amount of stabilizers and glomerates that will form and that is the reason that particular technique was adopted. In handling any piece of equipment in which the order of addition can be varied, it is highly desirable to set your cycle up on the basis of temperature rather than time and temperature controlling devices should be provided. We have used such a method ourselves experimentally and in production it has worked out nicely.

A Member: Have you any recommendations to make on what precautions to take on a relatively high plasticizer content of a dry blend for storage so that it will not cake if it is being stored for several months at a time?

Mr. Caine: The only danger in storing a dry blend containing a high percentage of plasticizer, and I presume you mean something around seventy-five parts—

A Member: Sixty-five, seventy-five.

Mr. Caine: —is in danger of drying or matting of the dry blend, and, of course, by simply providing a simple tumbling operation prior to the feeding of the extruder, the conglomerates, the matting will be completely avoided and dispensed with.

A Member: In planning the installation of a ribbon blending system, what factors are involved in determining the proper size unit?

Mr. Caine: There are certain general factors to be considered. One, only seventy-five to eighty per cent of the capacity of the blender can be utilized, but if you get a twenty-five cubic foot blender, you immediately calculate that only seventy-five per cent, or at the most, eighty per cent of that capacity can be utilized.

Two, a bulk factor of thirty-five pounds per cubic foot has been found to be quite accurate in determining the charge to a blender.

These two factors would then enable any manufacturer to calculate what production volume could be obtained from a particular size blender. There are, of course, other factors.

Cycles and so forth must be consid-

ered, and to be safe, on blenders of a thousand pounds or less, as a charge, cycles will normally run one hour or less. When you use the large size blenders such as you saw on the slide, the cycles will run about two and a half hours, of which about a third of the time is taken up in the actual cooling operation. If you had external cooling facilities, of course the entire cycle could be accelerated.

The large sized units are only adaptable to certain operations, large volume operations, in which labor cost may be high and in which you will have a very highly streamlined system whereby one operator might actually operate four blenders, such as is the case in our particular operation.

We would not recommend such a size, however, for most manufacturers' needs. You could probably get just as much output from a smaller blender running at a faster cycle than we get from the larger blenders.

With the small blenders, it is possible to get higher rates of agitation, thus reducing the cycles over that of the larger blenders where cost power limitations and other factors generally limit the agitation rate.

A Member: In your cooling cycle, have you taken that into consideration the over-all time that you mentioned, the batch?

Mr. Caine: You mean on the smaller blenders?

A Member: On any of the blenders.

Take a Beken blender, for instance, and you have got quite a mass of metal that will take some time to bring up to temperature. Now, in bringing that down to temperature, to reduce the temperature of your compound in your time cycle that you mentioned—

Mr. Caine: If you recall, when I described the Beken mixer, I said that the only approach to the cooling problem was an external cooling operation because it wouldn't be practical to try to attempt to cool the mix in the Beken mixer itself because the cooling would take as long as the mixing.

Now, by providing some other cooling system, you can quickly and rapidly cool it without affecting the mixing cycle in the Beken mixer.

A Member: I am rather interested in this whole problem, having worked on it about three years, but there is one question I would like to ask before I make a few additional remarks, if time permits, but I feel that from here on we ought to place more emphasis on the question of dry blending, methods and equipment, or upon the design and operation of extrusion equipment.

Mr. Caine: I think that we have gone almost as far as we can go in the actual preparation of the dry blend. I think it is now up to the extruder manufacturers and the people using the extrusion machines to do the rest of the work. I think if as much emphasis were placed on extrusion equipment and study of extrusion equipment as is placed in the developing of the mixing operation itself, there would not be any problems facing us today.

A Member: I am a manufacturer of this ribbon blending equipment. I feel that we haven't more than scratched the surface, but we are constantly working on many problems, and if time permits, I would like to make some variations and changes in the paper which I gave a year ago in Chicago on this dry blending, a little change in the art which developed within a month after I gave that paper. It might possibly be interesting, but I don't want to usurp any of the time here.

Chairman Flood: We will see how our time runs.

A Member: In the cooling operation, cooling out operations of the blender, you mentioned a cyclone method. Are there any other methods used that might be better than the cyclone method?

Mr. Caine: Yes; there are some very crude methods. I have seen where they simply take the dry blend and dump it on a clean floor and just let it cool by itself. But any exhaust cooling system such as the cyclone type of cooler can be adopted. The dry blend can be handled the same as any powder without any difficulty whatsoever.

Some people consider having two ribbon blenders, one placed above the other, in which the mixing is done in one and the coloring is done, and cooling in the second blender. There are many variations possible.

A Member: I might answer that question. We have just designed one, but it is purely pneumatic equipment straight through for a fifteen hundred pounds an hour batch. We are handling all material by low pressure air, and it will require, to cool this dry blend, nearly two hundred feet of eight-inch pipe at room temperature without any external water flow over it to take the temperature of the dry blend down to a safe temperature for storing. The thermal characteristics of this dry blend are—well, I think I can only describe them as kind of being a little bit "bitchy." I have mixed these blends in our laboratory, and discharged them at about 225° to 210° F, stored them in a one hundred pound metal barrel, and left them in the laboratory last winter, in which the temperature got down to a little bit less than forty degrees over night; the next morning, at eight o'clock, I put a thermometer in the middle of that barrel and it was still 180 degrees. I would like to have a house insulated with this stuff if it didn't cost so much, but the thermal characteristics of this material are interesting and important to study.

As I say, for cooling this thing out, if anybody is interested, I can give you a method we are now installing in some eight or ten plants.

A Member: Using a pneumatic cooling system, don't you get contamination between various vacuums?

A Member: No; that is carried out in batch lots and sent through this two hundred foot pipe and discharged through a master hopper and from there conveyed to various hoppers, over each extruder, as it requires.

A Member: Marty, you mentioned you can formulate from dry blend essentially the same as a mill mix stock. I was wondering particularly about stabilizers since you have less heat history in your compounding with dry blend, whether you would need as much stabilizer as you would on a Banbury or mill mix stock.

Also, I was wondering, along the same lines, with a compound of low percentage of plasticizer per resin content, whether you would have to use more stabilizer content in a dry blend with a low ratio of plasticizer to get the same as you would in a mill mix stock.

Mr. Caine: As far as the question of stabilizing content is concerned, there are many conflicting opinions as to whether or not we have too much stabilizer in our compounds or not enough. I think it is generally considered that we have more than sufficient stabilizer, and it could be possible to reduce the amount of stabilizer that is used in dry blending.

However, if you are considering reworking, all you need is stock, et cetera, and that has to be taken into consideration, because if the stock has to be reworked, it will require a little additional stability.

As far as the more rigid compounds are concerned, the problem of stabilization is a separate one from that having to do with dry blend. The study of the proper type of stabilizers there is studied from a heat and light stability standpoint rather than from a dry blend standpoint itself.

Once the problem has been solved, a satisfactory stabilizer system has been developed, it can then be rapidly adapted to the dry blend procedure, but little consideration is given to reduction of stabilizers purely and simply for the dry blend process.

A Member: You mentioned the fact that the equipment available for dry blending will vary in price from approximately $3,000 to $25,000. Have there been any figures developed as to what the production of dry blends would be in these various methods as compared to the initial investment? Is it possible that some of the higher priced equipment might be reduced a lot more on the basis of initial investment?

Mr. Caine: As I stated, each individual manufacturer's problems will have to be taken up in detail according to the amount of the product he wants to produce and the type of product he wants to produce.

I know of a dry blend installation where they have not spent more than $800 on a complete set-up. They were one of the first people in the entire history to do dry blending some four and a half years ago, and they have never done any formulating of dry blending on equipment that didn't cost them more than $800. A second-hand baker dough mixer which was renovated and an oil heating system for pumping hot oil around the jackets of the blender and a very simple screening operation, and they are in the dry blend business. It is as simple as that.

However, we don't recommend anything quite as crude as that, and ribbon blenders or other internal mixers of small size can be purchased for those whose volume may be in the order of only two hundred to say five hundred pounds per hour maximum. If that is so, figuring an eight-hour day and a five-day week, you can calculate the amount that is possible to produce with an investment, in the case of a 500-pound blend, of somewhere around $3,000.

A Member: I was also a little bit concerned about the limitation of plasticizer in dry blend and the thought just occurred to me that possibly some type of mixer like the Beken which gives considerably more turbulence than you get in the ribbon type, that you might not be able to use a polymeric plasticizer where in a ribbon blender, the polymerics would work.

Mr. Caine: As far as I know, the

polymeric plasticizers have been used very efficiently in the Beken mixers. They have also been used in the Speedmullor but in the case of the Speedmullor it is recommended in the use of resinous plasticizers that the plasticizer be preheated, since the viscosity of some of these resinous plasticizers are pretty viscous liquids and would be rather difficult to pour into the Speedmullor without reducing its viscosity.

I might add, the addition of a little filler goes a long way in increasing the amount of plasticizer that can be used. For example, we have been very successful in making a formulation that contains 120 parts of plasticizer per one hundred of resin, but we use filler in addition to the resin to give us a dry and free-flowing powder.

A Member: What type of powder?

Mr. Caine: The precipitated calcium carbonates, the common calcium clays, all work satisfactorily.

A Member: There is one question I would like to ask. How much difficulty do you have with moisture absorption with dry blends?

Mr. Caine: It is a problem and care should be given to the proper storage of dry blends. Care should be given to proper storage of any material that would have a tendency to pick up moisture, and certain concerns use stainless drums, moisture-proof drums to avoid any moisture pick-up. Others use a type of bag that is relatively moisture free. Others use drums that are lined to prevent any large amount of moisture being absorbed to give any real problem on extrusion.

Many people, if they have had dry blend stored for a considerable length of time, will preheat the dry blend to eliminate any moisture prior to using it.

We are going to run a little dry blend symposium in Room 1001 around 4:30 or 5 o'clock. We have plenty of plasticizer available. If there are any additional questions, I shall be very happy to answer them at that time.

(Applause)

Our next paper will be by Mr. Noble, Application Engineer, Silicone Products Engineering, Chemical Division, General Electric Co., Waterford, New York. His paper will be: "Silicone Rubber: A New Insulating Material for Wire and Cable."

. . . Mr. M. G. Noble presented his paper . . .

A Member: Can you tell us more about the moisture resistant properties of silicone?

Mr. Noble: These properties are influenced to a great extent by the fillers that are used.

Now, certain of the aerated silica gels that are being used now to get the best possible state unfortunately are not hydroscopic.

A Member: Have Banburys been used in the mixing of silicones?

Mr. Noble: The slide I indicated here indicated the open mill mixing. The Banburys are just a step behind this so far in the silicone rubber industry. We made our first runs just a short time ago, and we are in the process now of evaluating the production we get out of this. As far as we can see, Banbury mixing of silicone rubber is definitely a possibility.

The only change it is going to mean to us is that we are going to have to leave our catalyst out until after the compound is dropped out of the rubber mills. Otherwise, you are apt to get scorching in the Banbury.

A Member: Since there are a lot of problems in the processing of silicone rubber, and since silicone is a relatively new material, wouldn't it be better to leave the mixing at the moment to the experts rather than trying to do it ourselves?

Mr. Noble: There are certainly problems in the mixing program. However, we at Waterford feel that with our techniques that we have developed now, and we have demonstrated to a lot of people that have come to Waterford, mixing of silicones isn't as complicated as it seems. We do need a little more of variations in our mill. It is nice to have a mill where you can vary your speeds.

There is no question that all those factors add up to encouraging our customers to do their own mixing. We are not too worried about the technical angles. We certainly give them every service and we think they have no trouble.

A Member: Silicones seem to be able to do many other things that many elastomers cannot do. Do you foresee any possible change in the near future in the price structure of silicone rubbers?

Mr. Noble: I thought that question might come up. The bugaboo of price has hung around silicones since they first came out, and we are still confronted with it in a good many applications. However, I can make some general statements, although I am not in the price phase of it. Silicones came down in price at least ten per cent last year and there is likely to be reduction in price in the very near future again. We are forced down in order to get into these other applications in which silicones can be used if the price is right. We may eventually see the price come down to half of what it is now.

However, the question of price is not entirely based on the price of gum. The price is tied in with fillers. Now, as a new discovery, we are going to achieve a point where we are going to incorporate much larger quantities than we are using today. I believe the price may come down to less than $1 a pound.

A Member: How far in the future do you predict this change that you are talking about; that is, $1 a pound?

Mr. Noble: Well, I can't say. Perhaps in three years.

There is just one other point I would like to make about these fillers I mentioned here, just to show that I am not talking entirely through my hat. I don't know how many of you were up at the Rubber Group meeting of the ACS in Buffalo, about two weeks ago.

There you saw the advantage of the example of letting the fabricators have the silicone gum to work with. The paper was presented by the fabricator where he gave physical data on new silicone rubber compounds.

The fillers aren't readily available yet, so they can't go to mass production, but we know what those fillers are. We know we will be able to improve on those fillers, so I think there is no question in a very short time, say, two years or so, we will make it a success.

A Member: Your slide on the electric properties show the dielectric strength of silicone rubber insulation compounds was 400 to 500 volts/mil. What facts of safety over and above those published data would you use?

Mr. Noble: Those that I used were made, first of all, on .08 inch slabs cured sixteen hours at 250° Centigrade or 482° Fahrenheit. Naturally, as you go up in your wall thickness, your dielectric strength comes down.

I have not sat in on the actual designing of a cable. I do know we are thinking of uses where we are going to have to bring in these safety devices. Let's pass that question on to the cable engineers.

(Applause)

The last paper has been prepared by Mr. J. G. Hendricks and Mr. E. L. White. Mr. Hendricks is Director and Mr. White is the Assistant Director of the High Polymer Laboratory, National Lead Co., Brooklyn, New York.

The paper is on "Weathering Characteristics of Poly-vinyl Chloride Type Plastics."

. . . Mr. Hendricks presented the paper . . .

A Member: John, you showed, I think, that Dyphos was pretty good as a light stabilizer.

Mr. Hendricks: That is right.

A Member: Is that because it is an excellent stabilizer, or is it due in part at least to the fact that you get higher opacity in a Dyphos stabilizer stock?

Mr. Hendricks: The answer is quite clear. You do not get anywhere near as much opacity from dibasic lead phosphite as you do from anatase dioxide. You noticed when the anatase dioxides, even the tribase or another stabilizer was present, there was very little weather resistance. It wasn't changed at all, whereas, in a year and a half, or whatever those studies took, the Dyphos hadn't been changed at all.

A Member: What do you attribute the difference in the two different types of titanium dioxide to? You have rutile titanium dioxide and anatase titanium dioxide.

What is the difference?

Mr. Hendricks: The difference is in the absorption of the ultra violet. A paper in regard to rubber primarily was given about a year ago. It was contained in "Rubber World" and contained specific information on that.

A Member: We are having remarkable success with tribase as a stabilizer; I don't remember the exact formula of tribase as compared to Dyphos, but I believe it has a higher lead content.

Can you explain why Dyphos should be better on weathering than tribase when it makes a better over-all stabilizer?

Mr. Hendricks: The answer there has nothing to do with the lead content particularly. It has to do with the other portion of the molecule. In other words, the phosphite portion is a portion of the dibasic lead phosphite. The tribase, of course, is tribasic lead sulphate. It is the chemical makeup of the molecule as a whole which involves the phosphite portion as well as the lead. This per-

haps is not a complete answer and I can't give you a complete answer.

A Member: You have talked about these various pigments. Were they in the same proportions in the compound? If so, do you have anything to say about the amount that should be in the compound to do an efficient or an effective job?

Mr. Hendricks: In the slides that I showed, I believe there was present seven parts or ten parts, but I am not quite sure which. We studied them over quite a range. As far as what we would recommend in the way of amounts necessary to impart an optimum series, I would say five parts from one hundred resin. If I understand the first part of your question correctly, though, you might very well be asking indirectly if it is the volume of the filler that is important.

A Member: Yes.

Mr. Hendricks: It might be to a slight extent, but it is not the dominating factor. The dominating factor is a matter of absorption and protecting the pigment from the resin.

A Member: They were all light colors, I believe?

Mr. Hendricks: Yes, they were.

A Member: You didn't do any work with carbon black?

Mr. Hendricks: I didn't report any with carbon black. I could have very easily, but it would have been a matter of reporting considerably more than I had. Carbon black is quite effective.

A Member: Talking about formulating for maximum weathering protection, how about compounding, John, actual mixing? Is dispersion an important factor, do you believe?

Mr. Hendricks: The only way I can answer that is to say that dispersion is always an important factor. That is something I haven't been able to satisfy myself on.

I know I have seen data from other laboratories showing clearly that if stocks aren't rightly mixed, the differences in stability are tremendous. I have never been able to develop that same data myself. It may simply be that in some of these compounds we have that safety factor that was discussed in one of the preceding papers. Nobody is going to get me to say that dispersion isn't important any way you do it, but I don't know how much it would affect it compounding within reasonable limits.

A Member: Along that same line, have you done any work with liquid stabilizers?

Mr. Hendricks: Yes; a great deal of work is being done with dibulyltindilaurate.

A Member: Did that seem to show any better results, as far as dispersion standpoint? Of course, your liquid would give you a better homogenization.

Mr. Hendricks: Very true. It doesn't on our work, I am reasonably sure, because in the way that we set up and handle our compound, all the materials are adequately dispersed in the first place. Certainly I agree with you that all other things being equal, and if your mixing set-up is borderline, that wouldn't be important, but in our particular set-up, that doesn't apply.

I want to pick on dibulyltindilaurate. I think it is a swell stabilizer, but I think there are other materials, or dibasic lead phosphite that will provide much more satisfactory long-term weathering resistance than many of the liquids, and I think that dibulyltindilaurate is one of the best.

A Member: Mr. Flood, I think Mr. Hendricks should be complimented on the manner in which he presented this paper, particularly in giving us the benefit of their research.

Chairman Flood: That is very true. Our materials are not always the best for any particular given application, and I think a number of you gentlemen know that there have been a number of occasions when we recommend competitive products because in those very specific cases we feel they would do a better job.

On the other hand, I would hasten to say that is not always the case.

... Applause ...

WEDNESDAY MORNING SESSION

NON-FERROUS DIVISION
NOVEMBER 12, 1952

The meeting convened at 9:30 o'clock, a.m., Chairman William L. Wells, Assistant Superintendent, Rod Mill, Scovill Mfg. Co., Waterbury, Connecticut, presiding.

Mr. Wells: The first paper this morning is by a good friend of mine and I can say a lot of nice things about him, but they are mostly all personal. I am referring to Mr. Grayson B. Wood, Jr., who is connected with the Scovill Mfg. Co. as a metallurgist in the Research Department.

Mr. Wood graduated from Purdue University in 1942 with a Bachelor's degree in Metallurgy, spent some time in the Air Force and came to Scovill Mfg. Company in 1946.

He is going to talk on, "Effect of Certain Impurities on Free Cutting Brass."

... Applause ...

... Mr. Wood presented his prepared paper ...

Chairman Wells: I hope we can get a lot of real value out of Mr. Wood's talk by asking him some questions. Undoubtedly, he has raised some points in some of your minds that he might be able to clear up, and if there are any such, we would like to clear them up.

A Member: I was not entirely clear how you eliminate antimony from consideration. As I recall, you mentioned in the original analysis that antimony was higher in those cases where the blisters occurred, and you later mentioned that in some way you eliminate it.

Mr. Wood: We eliminated it by running similar tests with this and eliminating our antimony from where it was previously. In other words, in our original analysis with the annealing material, we had .005 present which was not present in the samples of the blistering, but when we held the antimony content to .005, the blistering disappeared.

On that basis, we felt the antimony was not important.

A Member: I am wondering if you can elaborate, if possible, what you found the effect of antimony to be on other properties such as machining and subsequent color of material. We are finding ourselves that the antimony is crawling up, too. What is your experience?

Mr. Wood: We haven't run any tests similar to this on the antimony as yet. We have in our cartridge brass run into some difficulties with it. You have to keep it very slow. As far as we know, we haven't run into any particular trouble in the free cutting. I don't know how high the antimony content is that you are running into. As far as I know, most of the analyses we have made spectographically, and antimony isn't running too much over .005 anyway.

A Member: Do you believe that the aluminum oxidizes in the solution?

Mr. Wood: First of all, the aluminum was in solution with the brass. There was no evidence of oxides that we could pick up. However, you very definitely had an inter-crystalline cracking, an envelope forming around the grains very similar to what you get with bismuth present in the brass. Whatever it is, we were not able to determine why the aluminum was virtually forming envelopes right around the grains on the surface.

A Member: Is it conceivable that we have a form of inter-granular corrosion?

Mr. Wood: It could very well be. That was one of the theories that was presented to us that we discussed at the time. I would rather not get into that too deeply, into the theoretical explanation of it, because we weren't very sure of it. We hashed it back and forth and every time we came up with it, everybody had an experiment.

A Member: Did you make any experiments as to the depth of that cracking, say, increased time or temperature? Did you find that fairly constant irrespective of any salt solvent?

Mr. Wood: We found the depth to be fairly constant. It ran four or five or six grains deep. The tests that we ran, of course, were from varying temperatures from 740° to 840° Centigrade, and there didn't seem to be any great difference in the depth of penetration. On those rods, incidentally, the surface was very brittle, as you can well imagine. If you take that rod and bend it, the whole surface flakes right off. It leaves a rough granular surface on the rod, similar to intergranular cracking. The whole surface would peel off like a sleeve coming off the rod.

I would say your corrosion theory is probably as close as anything we came up with. It sounds like a good possibility. It has to be in the salts. The air wouldn't do it and it was a high temperature salt.

A Member: Have you investigated the use of other salt baths?

Mr. Wood: Only sodium nitrate.

A Member: You mentioned that the thickness of the band didn't change very much, indicating that beyond a certain point, it wasn't progressing, but do you feel that perhaps with an aluminum content that band would increase? In other words it was the function of the

content of aluminum as to the thickness of the band?

Mr. Wood: There again is something that we didn't investigate, but, of course, most of these aluminum contents that we are talking about are relatively low. They are a tenth of a per cent. Now, as you go up higher, you get more into the alloys of aluminum. Then again it is something we would have to investigate. We gathered the information we needed at the moment, and the complete theoretical explanation of it and the further testing which really is indicated, but we haven't had the time to go ahead and do it. Those would be interesting points to investigate, and we should do it. . . . Applause . . .

Chairman Wells: I might add, from a production man's viewpoint, having been in on this problem, we have found that what Mr. Wood has just explained works out very nicely in production, and since these discoveries have been made, we have had no trouble at all from this source.

Our next paper will be delivered by Mr. David M. Schmid of Alloy Metal Wire Co., Prospect Park, Pennsylvania.

I presume that a good many of you people heard Mr. Schmid last year. He gave a very interesting talk, and in addition gave away some products that they make, and I was lucky to get one of his watchbands. I don't know what Mr. Schmid is going to give away, if anything, but I do know he will give us a very interesting talk.

Dave graduated from Carnegie Tech and went to work for Williams and Company as a Service and Developing Engineer. Since 1945, he has been with Alloy Metal Wire Co., and at the present time is vice president and general manager.

Dave is going to talk about "Cost Reduction Through Improved Plant Layout." . . . Applause . . .

. . . Mr. Schmid presented his paper . . .

A Member: Are those containers expendable? Do you get them back?

Mr. Schmid: We get them back. They are collapsible. They fold up so they don't take so much bulk coming back. These sides fold down. They have to send the spools back so we have to send them back in something.

A Member: What are those containers made out of?

Mr. Schmid: Just galvanized stainless steel wire. We are planning to have some of them made out of plain stainless steel wire for handling around the shop, because acid fumes are pretty hard on galvanized baskets.

A Member: You spoke about your junior board of directors. How do you select your junior board of directors?

Mr. Schmid: We had to start someplace, so our senior board of directors selected nine men from the twenty-five eligible for a six-month period, and then at the end of that six-month period, they get a rating chart where they rate each other on initiative, cooperative attitude, ability, ability to get along with their fellowmen, and, also consider the other fellows' ideas and their reliability as applied to production in different departments. The four who have the lowest rating are dropped from the board and the five who remain are the nominating committee who select four to replace the four who are dropped. We thus get a turnover on the board; no one person can serve for three six-month periods. They also elect their own chairman and a secretary.

They do not get paid for serving and they do it on their own time. They don't assume any of the functions of the senior board. They don't put the senior board out of work, but they are closer to the business than the senior board and we feel it is a good training ground.

A Member: Do they get more pay than the average worker does?

Mr. Schmid: No; they are all foremen, management men and engineers. They get no extra pay.

It is like Eisenhower's recommendation, "Take your job seriously, but not yourself."

A Member: Is that an efficiency record you keep for that average?

The reason I ask whether it was, I wanted to know if that has to be a one hundred per cent average.

Mr. Schmid: No; they have these charts all the time and, well, they have an A, B, C, and D, and, of course, the fellow who has the most A's on his chart has the highest rating. They don't get down to fine points like that. They keep a mental score card on a lot of these things although a lot of things they put down on paper; we found there is no politics that get into the thing.

A Member: What do you consider a good test for a revision of layout?

Mr. Schmid: That is a tough one. That is a good one, a good test for revised layout.

If everybody tore it apart, you wouldn't find everything wrong with it. First, the department head is the first man who has to go over it. It has to fit into all the other feeder departments and all the departments drawing from that department, too. That is an important test. That necessarily isn't complete.

Sometimes outside consultants talk it over with one of our competitors. They give you some good ideas, and your customers can always tear the hell out of it.

That is really a fact. We have our customers that come around. They often give you a lot of good ideas. When they go through our plant, we often show them the revised plant layouts of a department we are considering, because we have some problem with them for improvement, a new product or new process.

We always tell our customers, "Don't pass them back. Give us hell. That will help us more than anything else."

We are somewhat selfish that way. We would rather have them tell us what is wrong than what is right. Perhaps that isn't a complete answer. Maybe somebody here in the audience who had more experience in plant layout can give you an answer.

A Member: Would you care to comment on the effect of plant layout on mixed alloys, mixed materials?

Mr. Schmid: I am glad one of our competitors asked that question because he does a good job. My hat is off to Ralph, who has a nicely laid out plant, too. I will give you a somewhat facetious answer.

Build a separate plant for each alloy, and you man't mix them. (Laughter)

But to be serious, a good plant layout would contribute a lot to good housekeeping which will prevent a lot of mixing. I guess that is our secret.

When you make about seventy-five different mixes and they all look alike, you do have a tough job keeping them separate. You have all kinds of identification tests; magnetic, electric, but still somebody can take a spool that falls off of one skid and put it on a different one.

A Member: Have you ever considered the use of various colored spools to distinguish between the different types?

Mr. Schmid: Yes. Colored identification is good. I think we are going to add smell to it. We have all kinds of numerals. We have added color to some of them, and where there is tendency toward mixing, we are going to put a bell on the damn spool or skid or something to prevent causing that mixup.

For instance, put 316 stainless against 304; it is very frequently mixed. We put black labels on it. We keep it in black skids, and we got a couple of other spots where we identify it with black. We even paint the heads of the spool black.

A Member: Isn't it in your plant that I saw the different shaped tags?

Mr. Schmid: Yes, John; that is a good identification system. Small metal tags, all different shapes, and they have holes in them for quick identification because some of these fellows maybe can't read too well or see numbers, although most everybody knows the monetary system; but still those tags are awfully good.

A Member: What do you think of the use of a hook conveyor. Have you ever used hook conveyors?

Mr. Schmid: I don't really feel qualified to answer that. I am going to give you some ideas and I hope that will bring some discussion out of the crowd on the hook type conveyors that Les has brought out.

In a lot of the wire mills, they carry the wire from department to department on these hook-type conveyors. We don't do that. We will make anything from a pound to less than a million pounds, and predominantly, about thirty per cent of our orders are under three hundred pounds, and possibly twenty per cent of that is under ten pounds. We have a lot of small orders. We think that hook-type conveyors from department to department is a pretty hard thing to inaugurate in our plant.

What do the carbon wire mills do, maybe Bill can add a comment on that, but we use these jitneys with the peter pick-up.

If we put that on a conveyor, it has to travel all around before it gets to inspection and shipping. It has to have a red ticket to be taken off at inspection, a green one at annealing, and so forth.

However, we are not ruling it out. We are keeping an open mind on it, but for our type of production, it has been a pretty hard thing to utilize.

Chairman Wells: We have the same problem that you did, Dave, in that for small orders of alloys, the jitney type of transportation is a lot more flexible and a lot more economical. We don't continue the so-called peter pick-up truck after we get down into a smaller sized wire. We use skids and maintain a load of about three thousand pounds on each skid.

(*Please turn to page* 104)

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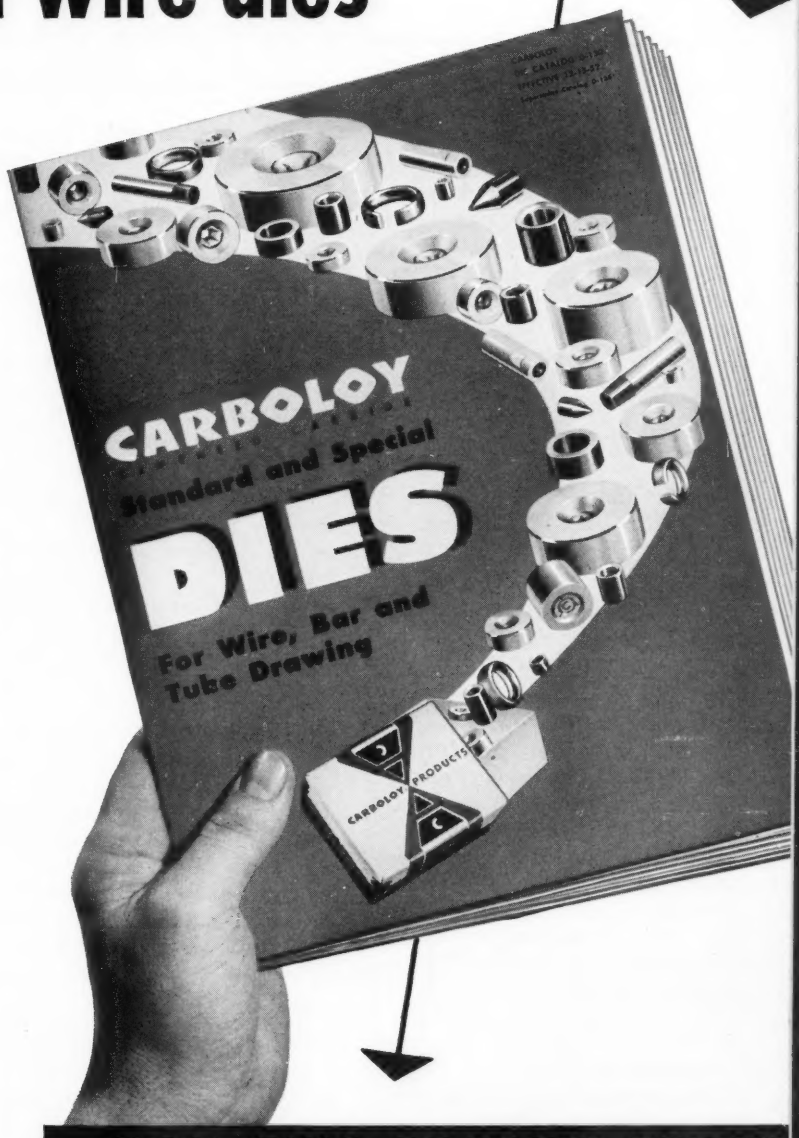

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Name_____ Position_____

Company_____

Address_____

City_____

Cleveland Wirecapades

by Fred H. Parkin
Parkin Chemical Company
Pittsburgh, Pennsylvania

Memo to Peter Igoe, Igoe Brothers, Inc., Newark, New Jersey.

★ ★ ★

Dear Peter: We certainly missed you at the annual Wire Association Convention in Cleveland. This is undoubtedly one of the few conventions you have missed in many a year. So let me try to relate in general what transpired among the Association members and guests at the Carter Hotel in Cleveland from November 10 through November 13. Here's hoping that you and some of your other friends will be interested.

★ ★ ★

In the first place, in days of old, the convention usually continued for its scheduled four days, but it was not so this year. Many hardy perennials arrived as early as the Friday before the opening day. This gave this particular group a decided advantage over the regular clan. The so-called "early birds," numbering several dozen, cased the city, found many good eating spots, night clubs, movies, art galleries, the city museum, and were already partially exhausted by the time the Monday morning roll call sounded.

★ ★ ★

The Sunday before the official opening many of us found our way to the Cleveland Stadium for a professional football game. The weather was cold but clear. There were several large parties on hand that I noticed; Standard Industrial's Chuck Orr and Floyd Hauger were seen in the environs with a large party. R. H. Miller's head man, Van Miller, was also present and accounted for with a group of fans. There was talk that Van might have played left tackle with the Cleveland Browns save for the fact that he was in the slightly "over age" grade as far as this type of a sport was concerned.

★ ★ ★

I also had a modest group at the game. In the hotel lobby just prior to leaving for the Stadium, I found myself stuck with an extra ticket. Noticing Bill Louder from Williamsport, Frank Weise from Portsmouth, Bob Joy from Bethlehem, and others, I said to them, "Who would like an extra ticket for the game?" Some husky lad whom I did not know said OK, and offered to pay me on the spot. I would, of course, have none of this, wished him well, and said, "I'll see you in the seats."

★ ★ ★

The joke turned out to be on me. Of all the many people already gathered for the convention, here I had given a ticket to one of my friendly competitors from The American Chemical Paint Company, Phil Burrell from Ambler, Pa. Couldn't have happened to a nicer guy, either!

★ ★ ★

Monday morning found the registration typewriters pounding out name tags furiously. Some 300 or more checked in on the very first day. Total attendance finally swelled to 622 officially registered. This was a bit over last year's record in Chicago, but then possibly some ebullient Republicans were celebrating their recent victory. (Just prior to our convention, you will recall, a former well-known Army officer had replaced a World War I Captain, the name slips me at the moment, as President of the United States.)

By two o'clock Monday afternoon, at which time the convention was officially opened, better than 350 people had been shaking hands all morning, exchanging greetings, and getting acquainted once again.

★ ★ ★

A chap by the name of Jeff Crum, ambassador at large for the R. H. Miller Company, rang the opening bell and we were off. He gave the new President of the Wire Association a splendid introduction. He even quoted Ken Lewis' book—a chapter on the Vanishing American. Jeff advised that the next speaker, the Honorable Mayor of Cockeysville, was proof positive that there was still a fine opportunity to start up a wire mill and make it go. Thus Leonard C. Crewe, Jr., (President of the Maryland Fine Wire and Specialty Company) better known as "Red," stood up and in his very finest oratory welcomed one and all to the convention. Red complimented the men of the wire industry on their fine records for last year. Sincere and heartfelt sentiments were expressed for all of us to the family of the late and beloved John Moritz. John passed away in September after a full life of warm friendship and a kind heart for everyone. Red expressed full confidence in the future of our steel industry and stated that there is a lot of potential business ahead with our ever increasing population. He closed his remarks with a booming voice, "Gentlemen, let's go!" (Applause)

★ ★ ★

One speaker that afternoon really hit the nail on the head. Mr. A. M. Gray, Assistant Superintendent of Development, Western Electric Company, Baltimore, Maryland, exclaimed, "You of the

Wire Association are an amazing group. Never have I seen such a warm and friendly feeling displayed at any convention. You gather here from all parts of the country, in fact from all over the world and unite almost as at a college reunion." As you know very well yourself, Mr. Igoe, there is a certain sentiment and spirit at our wire meetings that just cannot be surpassed.

★ ★ ★

And so the convention carried on. I shall make no attempt to report any detailed information about the technical papers presented. Perhaps you have already read them in this magazine. Anyway, a fellow writer with a much more skilled background than mine, Ed Sickels, is writing up these results in his own inimitable style elsewhere. Along about Wednesday of the week, and by now the strain is beginning to tell just a bit, there was the annual Mordica Memorial Luncheon. Again our Association President, Mr. Crewe, handled the speaking engagement with his usual aplomb. Nearly 200 members and wives were in attendance for this fine occasion. Ruth Spengel had arranged thoughtfully for an orchid for each wife as she entered the room. These were graciously received and added to the festive event. Your own fine lecture went over with a bang and while we were all disappointed at not being able to hear from you personally, I can assure you that Charlie Schiller was as acceptable a pinch-hitter as you could have selected.

★ ★ ★

Incidentally, Mr. C. D. Johnson from Worcester, former head of the Johnson Steel and Wire Company, came to Cleveland for this particular day. He will be our Mordica Memorial lecturer at the luncheon in Chicago in November, 1953, and had hoped to get a line on the proceedings from you. That is real foresight when one starts preparation for a speech a year ahead of time.

★ ★ ★

Wednesday evening brought some 581 men into one large ballroom for the annual Stag Smoker. As is usual there was quite a jam-up at the doors before the maitre d' officially announced dinner. But this apparently cannot be helped. Everybody and his brother is trying to get through one set of doors to seek out tables that will accommodate their individual parties, so it always makes for one grand rush.

★ ★ ★

Let's pass over the floor show which Mr. Eber Hubbard plotted for us with his usual fine skill. There was one particular act of extreme importance, and I know you will be interested in this one. It seems as if the Master of Ceremonies suddenly called up to the stage four members of the Association, and the fun began. A bagpipe was handed to Red "Windy" Crewe, who caught on quickly and blew furiously while a hidden transcription in the background blasted out with the Scottish national noise. A costume was added to him for good measure including a hat and even down to the tilt of the kilt. Next came Jerry "Hot Lips" McGreevy who also got the gist in a hurry and went through the proper motions blowing a trumpet to a hidden recording of Clyde McCoy's "Sugar Blues." By now the crowd was really in an uproar.

★ ★ ★

Next was that protege for Tommy Dorsey, Allan "Slip 'n' Slide" Dove from Canada. His imitation of a trombone player was perfect. Last but not least, the old Dean of wire men himself, Uncle Clem McGowan was handed a French horn, a costume and hat, with feather and all. He tooted properly with gestures while the appropriate circus music blared out from behind. The grand finale was even better. All four of them garbed in their ridiculous costumes with the wild background of four instruments now combined on one recording paraded around the dance floor. Never has so much been done for so many by so few. Music as we know it today had taken a setback for many years. When you import talent from Canada, Massachusetts, Maryland, and Georgia, how can you lose!

★ ★ ★

The balance of the evening was a good clean floor show, that any school teacher would have been proud to attend.

★ ★ ★

As you well know, these wire meetings are getting bigger and better each year. It was certainly no fault of the hotel management, but we are growing just too big for the physical setup in this hotel. Many members and wives found themselves in other hotels throughout Cleveland. This obviously necessitated commuting back and forth from their lodgings to the hotel headquarters. Perhaps this was good for them actually. When they left the Carter and went back to their own to retire, at least they were assured of a quiet night's rest.

★ ★ ★

It wasn't so at home plate. With so many corporations' suites functioning at full clip, (you remember the Yoghurt parties we used to have), occasional singing and music, wandering up and down the halls from floor to floor, it all makes for some confusion and noise. There is always one in every crowd who will insist on banging on your door lest you have slipped off to sleep.

★ ★ ★

Thursday, November 13, found two excellent plant trips scheduled. Ray Snow from American Steel & Wire Company in Cleveland allowed all of us on hand to see a real Wire Mill. So 276 visitors were exposed to the functionings of the Cuyahoga Works that morning. In the afternoon 102 interested in non-ferrous workings witnessed the sights at the Chase Brass & Copper Corporation plant. Both trips were extremely interesting and indicated skilled planning on the part of the managements.

★ ★ ★

'Long about this particular day —the last day of the convention— a state of weariness bordering on stark apathy set in. Any conventioner, to really do it up correctly, must lose a bit of sleep, indulge in additional parsley, sing a little louder than usual, stand around

(*Please turn to page* 94)

Looking Ahead Into the Coming Year

WHAT SOME OF OUR INDUSTRY LEADERS THINK

by Avery C. Adams, President
Pittsburgh Steel Company

From all indications, the year 1953, from a manufacturer's wire standpoint, should continue to be good.

★ ★ ★

The backlog of orders and the continuing demands are all indicative of a good year. It may possibly be that some of the specialty items in manufacturers wire will not be quite as much in demand as they have been the past year. However, the over-all picture should be entirely satisfactory.

★ ★ ★

To cite a few instances or a few examples of products that consume quite a bit of wire, we have ACSR Wire, and every indication is that this type of material should be heavily in demand for all of next year and probably for several years thereafter. The fastener industry is operating at a high rate and indications are that it will continue to do so. The anticipated increase in the automotive and building programs would also tend to keep the mills operating at a high level on manufacturers wire.

★ ★ ★

The change of administration in January 1953, we believe, will be a stimulus for business in general. There should be an increase in consumer demand, with the rumored relaxing or elimination of controls from a standpoint of price and materials.

★ ★ ★

Despite the fact that the steel industry has expanded, the per-capita consumption of steel, we believe, will be much greater in the future.

★ ★ ★

The above predictions and statements, while at the moment are those of this company, we believe they will also be true of the entire industry for the year 1953.

---

by David B. Miller
Manager, Wire Sales
Aluminum Company of America

Aluminum, and particularly the aluminum wire field, is an industry conspicuous for its phenomenal growth. The increase of primary aluminum producers, wire fabricators, and consumers—and the increased acceptance of aluminum in all forms—has created a continually expanding field.

★ ★ ★

The advantages which aluminum wire offers — appearance, workability, corrosion, resistance, lightness, conductivity, and in particular, favorable price—indicate a continuing and increasing demand for this product. 1953 should see an increased use of aluminum wire, both for established and for new applications, but only if industry is free from controls which limit developmental work and free sale of the product to all potential consumers.

★ ★ ★

Applications of aluminum are found throughout the wire field. Aluminum has long been a leader for bare overhead electric transmission lines. Since its commercial introduction in 1911, the use of ACSR (Aluminum Cable, Steel Reinforced) has grown so that today it has nearly pre-empted other conductors for this application. Until World War II, Alcoa was practically the sole producer of aluminum electrical wire and cable; now there are more than twenty. The applications of aluminum to secondary wiring, building wiring, and the electrical field in general, are expanding greatly.

★ ★ ★

The superiority of aluminum for joining aluminum has led to wide usage in the fastener and joining fields. Fasteners for sheet aluminum, nails for aluminum roofing sheet, and wire and brazing rod became important with the growth of aluminum itself. Their use is no longer confined to aluminum products alone, however. The non-staining characteristics of aluminum nails, for instance, have made them superior for use with wood and composition siding.

★ ★ ★

Aluminum insect screening has captured a major share of the screening market in competition with other materials. Its success in this field is due largely to its characteristic of not staining light masonry and woodwork.

★ ★ ★

As a component in various sub-assemblies, aluminum wire has many uses. It finds application in radio condensers and chassis assemblies, timing devices, recording instruments, automatic pencils, and the like. In household appliances it appears in many forms, such as refrigerator shelves and food trays.

★ ★ ★

A host of miscellaneous appli-

(*Please turn to page* 91)

Government Wire Production Information

Manufacturers of Bolts, Nuts, Screws and Rivets

The office of Price Stabilization has provided manufacturers of bolts, nuts, screws and rivets with an optional method of reflecting in their ceiling prices a pass-through of increased costs for steel and aluminum metals.

★ ★ ★

This action is covered by Supplementary Regulation 1 to General Overriding Regulation 35, effective November 12.

★ ★ ★

Simultaneously, Ceiling Price Regulation 118, which establishes ceiling prices for bolts, nuts, screws and rivets, has been amended to reflect the optional privilege given under SR 1 to GOR 35. This action is covered by Amendment 1 to CPR 118.

★ ★ ★

GOR 35 permits manufacturers who process steel, copper and aluminum to pass through, at each stage of fabrication, specified increases in ceiling prices which have recently been authorized for these metals.

★ ★ ★

Section 18 of GOR 35 provides for the issuance of supplementary regulations to give manufacturers a different method for calculating metal cost increases where the pass-through procedure provided for by GOR 35 is not appropriate for a particular industry.

★ ★ ★

About 400,000 different items of bolts, nuts, screws and rivets are produced by these manufacturers and they are sold to thousands of different customers. In this situation, the notification requirements of GOR 35 become not only burdensome for the manufacturer, but also unduly complicate the calculation of ceiling prices of products in which these items are used. Also, the normal application of GOR 35 would result in variations in the prices among producers of the same items. Since these items have historically been priced on an "in-line" basis, a disturbed price relationship would result. There would be, in addition, confusion for the purchasers of these products.

★ ★ ★

In order to avoid the confusion and complications involved, today's SR 1 to GOR 35 gives manufacturers of these items an option to use uniform price increases as follows:

Screws	1.6 percent
Large rivets (steel)	25 cents per 100 pounds
All other rivets	2.2 percent
Steel or aluminum bolts and nuts	2.2 percent

★ ★ ★

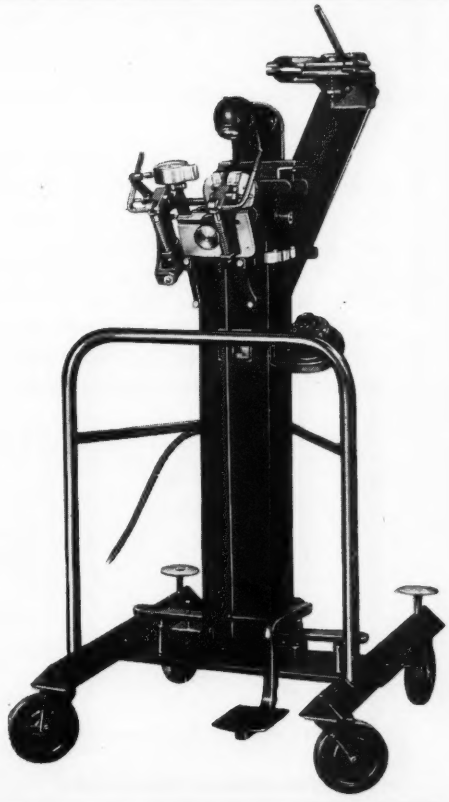
The only category of items not covered by the optional method of reflecting price increases is nonferrous bolts and nuts other than aluminum. Production costs of non-

MICROMETER PRECISION — MICRO-WELD — TRADE MARK REGISTERED

MODELS J-3-S and J-4-S AUTOMATIC MICRO-WELD BUTT WELDERS

These welders are used for welding high and low carbon STEEL, and STEEL ALLOY wire, ranging in size from .020" to .160" diameter. All operations on these units, which include the clamping of the wire being welded, contacting the welding switch, and upsetting the weld, are made by a single downward stroke of the foot pedal. Welders for high carbon steel wire are equipped with the exclusive MICRO-WELD Dial indicating annealing device to facilitate the annealing operation of high carbon wire.

Standard equipment with these units include annealing dies, filing vise, light extension cord, and mounting on a 4-wheel truck. Special units can be furnished for crane mounting.



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Telephone: STATE 2-7468

AMERICAN CHEMICAL PAINT COMPANY

AMBLER CHEMICALS ACP PROCESSES PENNA.

Technical Service Data Sheet

Subject: HOW GRANODRAW PHOSPHATE COATING FACILITATES COLD EXTRUSION OF STEEL

INTRODUCTION

By phosphate coating steel, prior to cold working it, extrusion, drawing, and other forming operations are greatly improved. In fact, it is the protective zinc phosphate coating that makes for the successful cold deformation of steel.

The tremendous pressures that most forming operations require produce extremely high frictional contact between die and metal. Without a protective coating, excessive galling (welding) of dies, breakage of tools, and unduly short die life will result. The combination of a non-metallic crystalline phosphate coating with an adsorbed lubricating film, possesses a low coefficient of friction while maintaining its stability under extremely high deforming pressures. This combination, therefore, greatly minimizes the aforementioned tool difficulties.

THE COLD EXTRUSION OF GENERATOR FRAMES

Cold extrusion is now being used advantageously in the manufacture of high production generator frames. This operation is facilitated by careful preparation and proper coating of the frame blank which is made from SAE 1010 open hearth plate steel.

After wheelabrating to remove the scale, the blank is rolled up and then fed automatically through a six stage dip wheel type washing machine which cleans the surface and applies the coating. The frame is then fed into an extrusion press where the wall thickness is increased on one end and reduced 47.5 percent on the other end. This operation produces concentric frames of uniform thickness and correct dimensions.

The Granodraw coating produces the proper surface to receive the lubricant by furnishing an extremely adherent film with the proper crystal size and continuity of coating required to insure maximum adsorbsion and tenacity by the lubricant. The lubricant, Montgomery DF 1101, is a combination of titre alkali soaps and resins. It is a powder which when dissolved in water and redeposited on the phosphate coated work piece, produces the necessary surface for subsequent operations. This film is dry and considerably less hydroscopic than similar coatings of the soap type. The concentrations of both the Granodraw and DF 1101 are maintained by simple chemical analysis.

PROTECTIVE COATING SEQUENCE

Stage	Operation	Chemical	Time	Temperature
1	Load and unload			
2	Cleaning	Tri-sodium phosphate and soda ash	1 Min.	180° F
3	Water rinse		1 Min.	180° F
4	Zinc phosphate coating	"Granodraw"*	4½ Min.	165° F to 180° F
5	Water rinse		2 Min.	180° F
6	Lubricating	H.A. Montgomery lubricant DF 1101	4½ Min.	190° F

*Trade Mark of the American Chemical Paint Company

CHEMICALS ACP PROCESSES

ferrous bolts and nuts vary sharply between producers who specialize not only in types of nonferrous bolts and nuts produced, but also in methods of marketing. Accordingly, the provisions of GOR 35 are appropriate for these particular items and no option is provided for them.

Welding Rod IAC

Need of their industry for higher ceiling prices to offset rising costs of materials and wages was stressed by members of the Welding Rod Industry Advisory Committee at their first meeting with OPS officials.

★ ★ ★

The committee represented electric welding rod manufacturers. The rods, used in arc welding, are made of carbon or alloy steel, coated with flux or alloy materials.

★ ★ ★

Primarily, these materials provide protection for the welded joint from oxidation. To a minor extent they may enter in to the alloy.

★ ★ ★

Committeemen reported that about half of the 700 different types and sizes of welding rods produced employ rutile, or titanium dioxide, in the flux. Imported rutile has more than doubled in price in recent months, committeemen said. Other important flux materials which have increased in price are ferromanganese, ferrocolumbium, ferromolybdenum, ferrochromium, tungsten and cobalt.

★ ★ ★

They said wages in their industry mostly follow the pattern of the steel industry, and manufacturers generally have paid or will be obliged to pay substantially increased wages.

★ ★ ★

Committeemen said that increases in ceiling prices which they have obtained from authorized pass-throughs of the increased cost of steel and outbound freight did not provide adequate relief.

★ ★ ★

One committeeman reported that between January and September 1952 the average cost of rods in his plant had gone up from $8.95 to

$9.95 per 100 pounds, as against an average increase in price from $11.30 to $11.85.

★ ★ ★

Another member reported material cost increases averaged 65 cents per 100 pounds of rods. Still another reported that wage increases paid since June 1951 represented an increased cost of 16 cents per 100 pounds of rods.

★ ★ ★

Committeemen reported that welding rods were generally selling at ceilng prices.

Primary Copper

The Office of Price Stabilization has authorized a price increase for some producers of products using primary copper so as to reflect the increased cost of foreign copper.

★ ★ ★

This action applies only to producers operating under the General Ceiling Price Regulation (GCPR), principally manufacturers of copper alloys and copper dust. It does not apply to producers of copper clad or copper coated products covered by SR 100 to the GCPR.

★ ★ ★

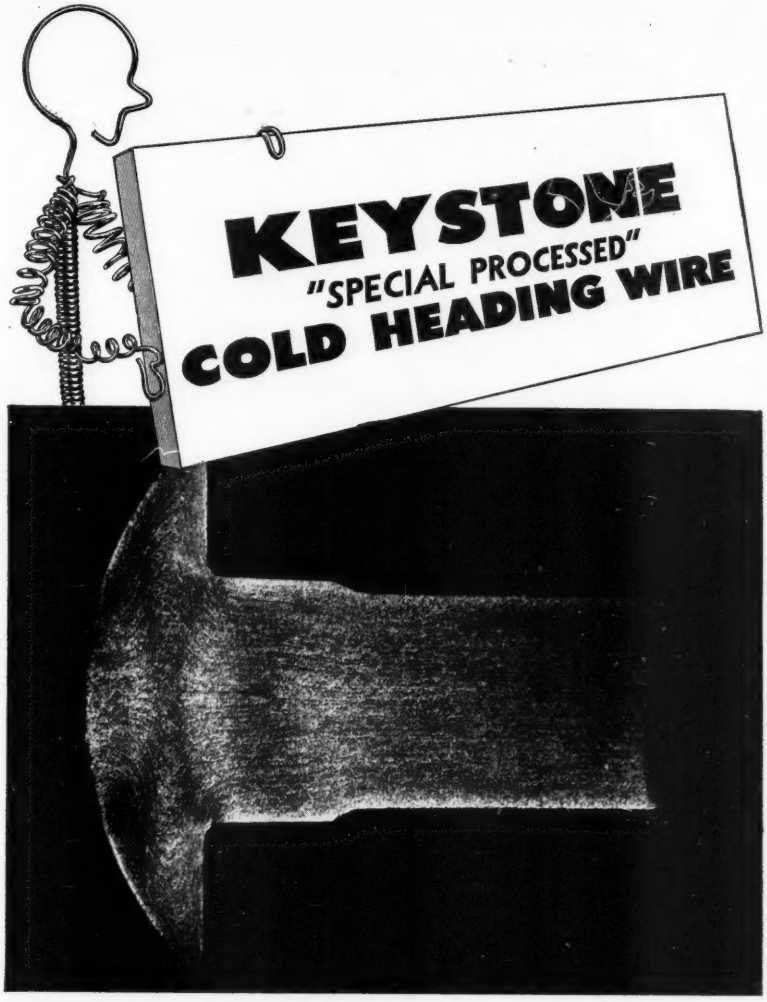
It gives these producers the same price adjustment that was previously granted to manufacturers of brass mill and wire mill products under Amendment 1 to Ceiling Price Regulation 68 and Amendment 1 to Ceiling Price Regulation 110.

★ ★ ★

The new order, Supplementary Regulation 125 to the GCPR, is not expected to affect materially the prevailing price level. The number of producers using primary copper who operate under the GCPR is small. Their aggregate consumption of primary copper amounts to only about two percent of the total domestic consumption of copper.

★ ★ ★

Under the new supplementary regulation, producers who use only primary copper in their products may increase their GCPR ceiling price by 3.84 cents per pound of primary copper contained. That sum reflects 80 percent of the increase in the price of foreign copper which went into effect last May.



UNIFORM, strength-giving, grain flow characteristics are clearly indicated in the above macrograph of a carriage bolt made from Keystone "Special Processed" C1038 Cold Heading Wire. The long, continuous fibres through shank and head give the "inside story" of efficient cold heading which results in longer die life, increased production and a better finished product.

The following analysis of "special processed" wire is recommended for difficult cold heading:

C1006 - C1012 for Clutch Heads
C1006 - C1022 for Phillips Heads
C1108 - C1109 for Phillips Head Wood Screws
C1035 - C1038 for Heat Treated Screws and Bolts

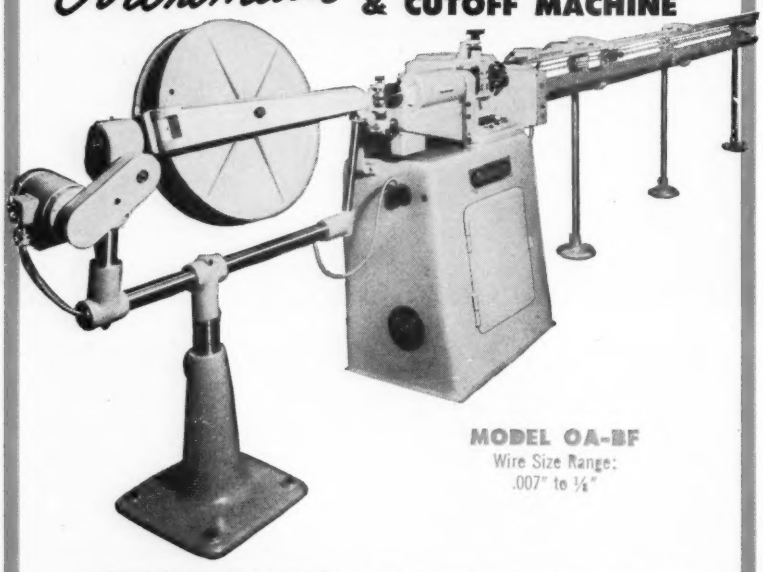
Keystone is prepared to help solve any of your industrial wire problems. Your inquiry is welcomed.

Keystone Steel & Wire Company
PEORIA 7, ILLINOIS

High Speed Precision Straightener For Wire As Small As .007"!

MEDART

Minimatic WIRE STRAIGHTENING & CUTOFF MACHINE



MODEL OA-BF
Wire Size Range:
.007" to ⅛"

- *COMPLETELY NEW* in design and operation, the Minimatic establishes far higher than usual standard for economy, accuracy and speed in the straightening of small round wire.
- Fully automatic and self-feeding after coil is started into machine. Full vision push button control panel.
- Entire coil is straightened and cut without attention from operator. Disc-type cutoff, with only 2 moving parts, is electronically operated. Protects against swelling and expansion of wire ends.
- Adjustable rotary die straightening mechanism insures maximum precision for any size wire within range of machine.
- Floor space 7′ 4″ x 2′ 0″ plus length of runout section. Requires only 2 H.P.
- A "must" for manufacturers of needles, watches, other small assemblies in which precision-straightened fine wire is used.

Write For Brochure

THE MEDART COMPANY 3535 DE KALB STREET ST. LOUIS 18, MISSOURI

Producers of Brass Mill and Copper Wire Mill Products

The Office of Price Stabilization has announced that producers of brass mill and copper wire mill products will not be required to recalculate ceiling price adjustments covering costs of foreign copper before March 1, 1953.

★ ★ ★

On July 1, 1952, these producers were permitted to increase their ceiling prices to reflect increased cost of foreign copper. This action was taken under Amendment 1 to Ceiling Price Regulation 68, covering brass mill products, and under Amendment 1 to Ceiling Price Regulation 110, covering copper wire mill products.

★ ★ ★

Because of the fact that copper must now be purchased in Chile, rather than in New York, there is a time lag between the time of purchase and the sale of the finished product running anywhere from 90 to 120 days. The industries affected have requested that any recalculation of the July 1 adjustment should not be required before March 1, 1953, so that they may buy at the 36½ cents price in anticipation of being able to sell the same material without the July 1 adjustment being reduced by OPS before that time.

★ ★ ★

In view of the nature of the copper market at the present time and the continued firm price of 36½ cents a pound for foreign copper, the request appears reasonable and, therefore, it is not contemplated that any recalculation of the July 1 adjustment will be required before March 1, 1953, OPS officials said.

★ ★ ★

The new order became effective November 24th.

Permit Some Steel Wire Makers to Calculate Prices on Column Basis

The Office of Price Stabilization has authorized producers of some merchant wire steel mill products to calculate ceiling price increases on the basis of columnar price lists rather than by using dollars-and-

cents figures previously authorized.

★ ★ ★

Also, resellers and subsequent processors of these products are permitted to reflect in their ceiling prices a pass-through of increases costs based on the columnar method of pricing.

★ ★ ★

Use of the columnar basis of pricing rather than the dollar per ton basis will not result in any substantial change in the level of ceiling prices for these products, OPS officials said.

★ ★ ★

This action is covered by the simultaneous issuance of Amendment 2 to SR 100, Revision 1, under the General Ceiling Price Regulation; SR 3 to General Overriding Regulation 35, which corrects typographical errors in Appendix "A". These actions are effective December 6th.

★ ★ ★

The merchant wire steel mill products covered are: Stock wire nails, stock staples, woven fence, welded fence, wire netting, fence posts, coil and loop wire bale ties, barbed and twisted wire, and wire hoops.

New Pricing Formula for Copper-Clad Products

The Office of Price Stabilization has provided a special method for determination of ceiling price increases for producers of copper-clad and copper-coated steel products such as wire, sheet and strip.

★ ★ ★

This action is covered by Amdt. 1 to SR 100, Revision 1 to the General Ceiling Price Regulation, effective December 6th.

★ ★ ★

Some steel mills produce copper clad and copper coated wire, sheets and strips for which a ceiling price increase of 4.7% is provided under revised SR 100. This increase covers increased production costs of these steel mill products but does not reflect the increased cost of copper used in their production.

★ ★ ★

In order to carry out the OPS

NEW AO ELDER

DIE-ANGLE SCOPE

Developed and manufactured under license with Mr. Flint C. Elder, former Director of Research at American Steel and Wire Company.

Checks Carbide Die Entrance Angle

. . . INSURES WIRE QUALITY

Now die entrance angles can be carefully checked in less than one minute with the new DIE-ANGLE SCOPE. Even unskilled operators with only a few minutes' instruction can make measurements to an accuracy of ± 10 minutes of arc. The die is *not* damaged in any way. Multiple angles and poor polish are obvious immediately. Every size of die—down to the smallest at .005"—can be measured accurately.

THINK WHAT THIS DEVELOPMENT MEANS to you in more efficient control of wire drawing processes—in higher quality, reduced spoilage, *greater profits*. Here for the *first* time is a practical shop instrument for checking carbide die entrance angles *before* they can affect wire quality.

The AO Elder Die Angle Instrument is compact, portable simple to operate, and, like all AO Scientific Instruments, *dependably accurate*. It is sturdily constructed of lightweight aluminum castings, with integral light source and transformer. Supplied in leatherette carrying case. Write *today* for free literature.

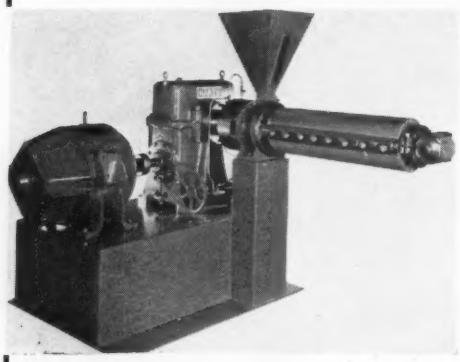
PRICE COMPLETE $650.00

American Optical COMPANY

INSTRUMENT DIVISION • BUFFALO 15, NEW YORK

Presenting the New . . .

HARTIG EXTRUDER

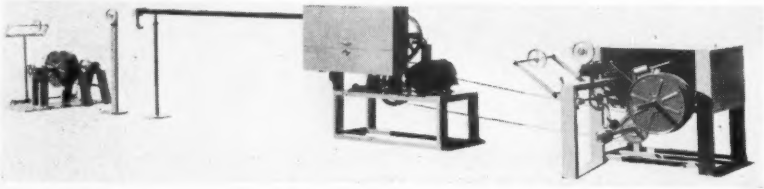


A result of constant research and development to produce the best in a modern, all electric machine for PLASTIC EXTRUSION on Electric Wire and Cable

Manufacturing extruders since 1937, HARTIG has pioneered some notable firsts: the electrically heated extruder, the "quick opening clamp-type head" and the one-piece cylinder in lengths up to 60".

EXTRUDERS MADE FOR ELECTRIC CONDUCTORS, SHAPES, TUBES, RODS, BELTING.

HARTIG extrusion machines are so designed, constructed and priced as to afford you the most efficient and profitable production. HARTIG engineering service is always at your disposal.



HARTIG also manufactures auxiliary equipment for wire covering operations. The illustration above shows a wire Pay-Off, Cooling Trough, Capstan and Take-Up. From this one source you can secure all equipment necessary to make a complete installation, ready to operate.

All of our equipment is competently engineered, accurately and well-made of the best materials and designed to function as a unit over long periods with a minimum of servicing.

You are invited to consult us on your needs.

Hartig Engine & Machine Co.

448 Hillside Ave., Hillside, N. J.
Tel.: UNionville 2-2164 — 2126 — 2127

ENGINEERING, DEVELOPMENT and SPECIAL SERVICES

policy of granting ceiling price increases to reflect increased cost of production of steel and increased cost of foreign copper, the agency has provided the following method for determining ceiling price increases for producers of copper clad steel products:

1. Multiply the amount of the copper contained in the product by 24.50c a pound.

2. Deduct the amount calculated under (1) from the previous GCPR ceiling price of the product which was determined before issuance of SR 100, Revision 1.

3. Multiply the remainder by 104.7%.

4. Multiply the copper contained in the product by 28.34 cents a pound (this represents an average increase in the cost of copper of 3.84 cents a pound).

5. Add together the amounts calculated under (3) and (4). This total represents the new increased ceiling price for the product.

The amount of copper content of a product is determined on the basis of net copper content as distinguished from its copper base alloy content.

New Rolock Catalog on Fabricated Alloys

Rolock Incorporated, Fairfield, Conn., manufacturer of equipment for Heat Treating and Finishing of metal parts, has issued a new catalog, No. B-9 (Corrosion Resistant Section).

★ ★ ★

This section describes and pictures baskets, racks, crates, tanks, sinks and special equipment for degreasing, cleaning, dipping, galvanizing, pickling, quenching, and other processing operations.

★ ★ ★

Every type of basket, centrifugal, trunnion, drop-bottom, rotating (manual and motor-driven) is shown, including many unusual shapes and designs for specific duties.

★ ★ ★

Of special interest to manufacturers of steel shell cases are the new type of work-holder baskets, which serve through automatic cycles of many operations, after the cupping operation, and through the final draw. Included is Rolock's new articulated "Serpentine" grid, designed to retain its shape under severe exposures . . . as a tray or basket bottom.

★ ★ ★

Copies of B-9 Catalog are obtainable from the above address.

One Hundred Trades to Exhibit at British Fair

Nearly 100 different industries will be represented at the **British Industries Fair** scheduled for London and Birmingham, England, from April 27 to May 8, 1953. Displays by 2,500 exhibitors will be arranged in 30 groups of allied trades in three centers. Consumer goods will be shown at Olympia and Earls Court in London, and heavy industry at the giant exhibition hall at Castle Bromwich, Birmingham. Twenty-two Commonwealth countries will be represented in what promises to be their most impressive display in recent years.

★ ★ ★

In 1952, 1,150 U. S. buyers attended the Fair. To assist those expecting to go next year, comprehensive catalogs listing the names and addresses of the exhibitors and describing their products will be available in the United States three months before the opening of the Fair. Business men are invited to ask the nearest British Consulate for a free copy, indicating whether they want the London or the Birmingham edition, or both.

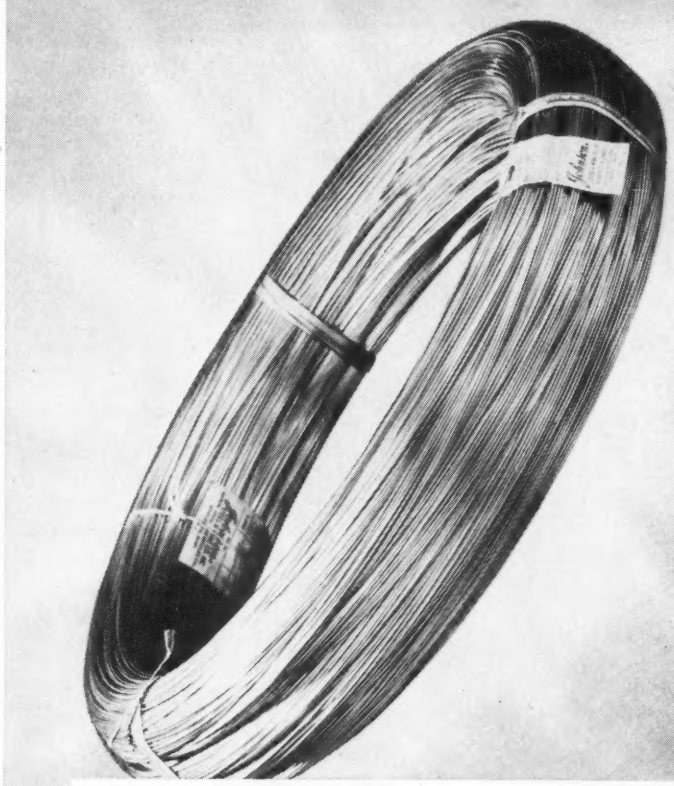
Wheeler Insulated Wire Expanding Facilities

The former Waterville Manufacturing Company plant has been leased by the **Wheeler Insulated Wire Company** and will figure in a new expansion program which will add some 12,000 square feet of operating space to the wire concern's production facilities. The company plans to employ approximately 200 additional workers. Full new scale operations are expected to be in force early in 1953.

★ ★ ★

A. R. Welton, president, in announcing completion of negotiations for the former Waterville Manufacturing Company buildings, intimated that the company considers the move a permanent expansion step. He stated that present orders will require the extra facilities for more than a year and that the firm has been given reassurances of additional orders. The company presently employs 560 workers.

JOHNSON



HIGH QUALITY HIGH CARBON WIRES

When the second man appeared on earth, the rights of the first were cut in half. Now divide yourself by the total population and that explains everything.

We do not claim the know-all of the wire making business, but we have been associated long with the men of this great wire making center*—and from many of these wire men have come suggestions that have led to improvements in manufacture all the way from rod to finished product.

*Worcester is the cradle of the American wire drawing industry.

JOHNSON STEEL AND WIRE COMPANY, INC.
WORCESTER 1, MASS.
New York Philadelphia Cleveland Detroit Akron Chicago
Atlanta Houston Tulsa Los Angeles Toronto

SUBSIDIARY OF PITTSBURGH STEEL COMPANY

NARCO METAL BOUND REELS provide 300% more service. Exhaustive tests have shown a 24" all-wood reel will average four trips—*with repairs*. A NARCO METAL BOUND REEL of the same size will average 12 to 16 trips *with no repairs*. All for only approximately 50% more cost.

NARCO METAL BOUND REELS are made in 12" to 48" diameters. All-wood reels from 12" in diameter to any size required.

All reels shipped assembled or knocked down for assembly to wood or steel drums.

Further information or quotations promptly furnished.

North Anson Reel Co.

TELEPHONE MADISON 187-2 NORTH ANSON, MAINE

Mr. Welton states that the company found an expansion program necessary because of increased requirements for the firm's wire and electronic products. Government orders, particularly, have stepped up production considerably. Plans are in the making for the probable organization of three shifts when necessary tooling has been completed.

New Corrosion Proof Surfacing Material

A new trowelled-on surfacing material promises to become a widely accepted substitute for acid proof brick.

★ ★ ★

The material, known as Ceilcrete is a combination of synthetic liquid resin, inert fillers and pigments and cures into a hard dense stone-like corrosion proof surface that will withstand trucking, foot traffic and abrasion with a rated load carrying strength about four times greater than that of dense concrete.

★ ★ ★

Its greatest usefulness is in its application to walls and floors that are subject to corrosive liquids or atmosphere, such as are found in food processing, metal finishing, plating, rayon, cellophane and petro chemical industries.

★ ★ ★

Ceilcrete is trowelled on the concrete surfaces of tanks, walls, floors. It resists solvents, acids and alkalis, and is non-sparking, non-slip and has high impact strength with remarkable abrasion resistance.

★ ★ ★

The material is usually applied in a single layer 1/8" thick. The small amount of material required adds very little extra to the weight of floors, nor does it appreciably change the elevation.

★ ★ ★

It is available in black and colors, and is manufactured by **Ceilcote Company,** 4832 Ridge Road, Cleveland 9, Ohio.

Carbide Die Company Formed

Ralph B. Oliver and **Elmer C. Weber,** formerly with Firth Sterl-

ing, Inc., have formed a new company, **The Pittsburgh Carbide Company,** Monongahela, Pa., and are manufacturing carbide die nail tooling, side and end blocks, wire, bar and tube dies, heading hammers, wire forming tools and other carbide specialties.

★ ★ ★

Both men have been with Firth Sterling for the past ten years and, upon the change in Firth's sales policy announced early in 1952, they resigned to enter upon the manufacture of finished Firthaloy carbide products.

Wire Actually Drawn at Metal Show

Visitors at the booth operated by the **Alloy Metal Wire Co., Inc.,** of Prospect Park, Pa., were able to see wire actually being cold drawn.

★ ★ ★

A Vaughn Ringblox fine wire drawing machine was set up through which was drawn .025" diameter Inconel to a finished size of .0045" diameter. A plexiglas door was inserted in the front of the machine so visitors could view the wire passing through the diamond dies and being spooled.

★ ★ ★

Many visitors were given a new piece of literature that gave them a quick tour of the Alloy Metal Wire company's plant through pictures, in which the complete facilities of the plant were featured.

Offers Computing Service for Complex Calculations

Mathematical Computing Service, 105 Court St., Brooklyn 2, N. Y., specializes in performing services for industries and universities desiring engineering calculations, charts and nomographs of a high degree of complexity and the treatment of related mathematical problems in the fields of mechanical and electrical engineering. An important function of our group is the mathematical formulation and complete solution of a problem from given physical data. The staff consists of consultants holding Doctorate Degrees who are qualified to treat problems in applied mathematics related to the physical sciences.

3 ways *Solar* solves a sales problem... IN YOUR FAVOR

...with SOLDURA GRAY WIRE COLOR SOLUTION

1 GREATER SALES APPEAL!

Gray Soldura gives the buyer visible evidence that the flameproof compound on non-metallic sheathed cable and service entrance cable is completely sealed and covered. Moreover, it camouflages service entrance cable used on white houses and forms an excellent base for the subsequent application of house paint.

2 STAYS CLEANER!

Gray Soldura *looks* cleaner because it *is* cleaner. It's used with a clear wax top dressing (which makes it easier to pull through joists or fish through conduits) and will not mark up walls during installation. Workmen's hands stay cleaner, too.

3 PROTECTS against STICKING!

Actual laboratory tests have shown that gray Soldura, applied with a proper saturant and finish, will prevent sticking at temperatures as high as 140°F. and will not flake off under freezing conditions.

FOR GREATER SALES APPEAL... FOR CLEANER APPEARANCE, EASIER HANDLING, AND FREEDOM FROM STICKING OR FLAKING... USE SOLDURA... THE GRAY WIRE COLOR SOLUTION THAT BUILDS SALES.

SPECIFICATIONS*

Weight per gallon	15-16 lbs.
Total solids	75-80%
Viscosity, Gardner Mobilometer @ 77°F., 250 grams load	15-20 seconds
Estimated coverage—Sq. Ft. per gal.	1250-1500
Number of coats recommended	Two, for best results
Colors	Light, medium and dark gray

**Gray Soldura is soluble in alcohol, acetone, and common lacquer solvents, but is not soluble in gasoline and petroleum solvents.*

FOR SPECIFIC INFORMATION ABOUT GRAY SOLDURA MS-551 AND A COMPLETE REPORT ON OUR LABORATORY TEMPERATURE TESTS, WRITE TO SOLAR COMPOUNDS CORPORATION.

Solar Compounds Corporation
Solar Varnish Corporation
The Originator of Wire Color Solutions
1213 WEST BLANCKE STREET • LINDEN, N. J.

specify

SENECA

ROUND AND FLAT

SPRING WIRE

Whatever your spring wire requirements—consult with Seneca! Our production *geared to precision* in manufacturing oil tempered and hard drawn wire—round and flat—for all types of high grade mechanical springs. You'll find that Seneca uniformity and dependability help the spring manufacturer produce high quality springs at low cost. Make Seneca your headquarters for all needs in Quality Wire.

Seneca

WIRE & MFG. COMPANY • FOSTORIA, OHIO

Representatives in practically All Principal Cities

Abstracts

RECENT DEVELOPMENTS IN DIAMOND TECHNOLOGY: WIRE-DRAWING DIES AND GRADED DIAMOND POWDER.

R. E. Leeds (GEC Res Lab.) GEC Journ 1952 Vol. 19 (3) pp. 139-145 (July); Met Ind 1952 Vol. 81 (8) pp. 147-148 (Aug. 22).

Describes piercing of reduction angle of diamond drawing die on drilling machine similar to miniature lathe. Steel needle aligned to headstock shaft revolves at 6,000 rpm while stone, with entrance and approach drill and filled with graded diamond powder suspended in oil, is reciprocated against end of needle. Diamond powder (max 5.08 micron grain size for 0.0003 in. bore) is crushed between end of needle and base of incision in die stone under impact of hammer blows. This reduces powder and slowly (more than 100 hr. drills) die, profile being maintained by continually sharpening needle. More economical production method is drilling by electric spark. If diamond is immersed in conducting liquid, such as saline solution, just beneath surface of liquid, this becomes electrically conducting over its surface. Electrical circuit through saline bath is completed by 2 electrodes, one on stone producing spark. one immersed in solution. Reduction angle zone is made with bore as small as 5 micron dia. in about 2 hr., less for larger dia.

Apparatus consists essentially of slowly rotating glass dish to hold salt solution with platform in centre to support stone. Needle, pre-ground to correct angle, is suspended on spring. Contact pressure between stone and needle is varied by lever at top of apparatus, and alignment of needle to stone made by 3 centralizing screws. Electrical equipment, with 60 to 240 V. range, is housed behind spark apparatus. Describes equipment for crushing and grading diamond powders for use in die production, ie impactor mill for powder consisting of 'blocky' particles and 'Sherwen' electromagnetc sieve shaker made by Fraser & Chalmers. Gives details for powders graded by sedimentation (range 0-5 to 1-200 micron), elutriation (8-18 to 50-76 micron) and centrifugal action (0-1 to 5-10 micron). 10 illustr., 3 tables.

★ ★ ★

PLANT AND EQUIPMENT FOR WORKING AND DRAWING WIRE.

A. Frascio. Riv Mecc 1951 Vol. 2 pp. 5-10 (Oct. 13); pp. 15-19 (Act. 27); abstr. Iron & Steel Inst. Journ. 1952 Vol. 171 (4) p. 429 (Aug.) (Original in Italian).

Principles to be adopted in modern wire drawing plant. Layout diagrams given together with descriptions of handling appliances, wire drawing machinery and pickling plant.

★ ★ ★

CALCULATION OF DRAWING DIE DIMENSIONS FOR MULTIPLE DRAW MACHINES.

W. Lueg. Arch Eisenhuettenwesen 1952 Vol. 23 pp. 95-101 (Mar.-Apr.); abstr. Iron & Steel Inst. Journ. 1952 Vol. 171 (4) p. 429 (Aug.) (Original in German).

Description and development of procedure given by E. L. Baay for graphic

determination of intermediate die dia. for wire drawing on multiple draw machine with equal or varying reductions at each pass. By introducing auxiliary scales, a further group of ref. lines, and second momogram field, general diagram devised with which die dia and all other characteristics may be rapidly and reliably determined for drawing processes with any type of sequence. Use of ordinary slide rule for solving same problems fully described. Die dia, individual and total reductions, increase of length and number of draws determined with a few movements of slide rule. Finally, relations derived from which to calc min. reduction of multiple draw machine in which speeds of individual sheaves fixed. Shown that smallest reduction of cross-section of such machine determined only by ratio of speeds of first and last drawing stages.

★ ★ ★

WIRE DRAWING LUBRICANTS
A. E. McAulay. Wire Production 1952 Vol. 1 pp. 8-12 (Mar.) abstr. Iron & Steel Inst. Journ. 1952 Vol. 171 (3) p. 330 (July).
Functions of lubricants in wire drawing and lubricants suitable for various wire drawing operations enumerated.

★ ★ ★

CALCULATING AIDS IN WIRE DRAWING.
K. Schmiz. Draht 1952 (6) pp. 31-35 (July) (English ed.).
Basic relations between following factors discussed: (a) relation between length of wire and area reduction, (b) number of drawing operations or distribution of total area reduction to individual draws, (c) drawing force in kg, (d) hp required for drawing operations, (e) drawing times. Basic relations discussed under consideration of work-hardening properties, and diagrams developed. 7 illustr.

★ ★ ★

CARBON STEEL WIRE
Anon. Am. Iron & Steel Inst., Steel Prod. Manual 1952 Sect. 16 183 pp. (Jan.); abstr. Iron & Steel Inst. Journ. 1952 Vo. 171 (3) p. 335 (July).
Manufacturing practice, coarse and fine wire, evaluation of wire, and chemical requirement of carbon steel wire as produced in USA. Table with comparative data on dia, sectional areas and weights of 2 American and 2 British wire gauges.

★ ★ ★

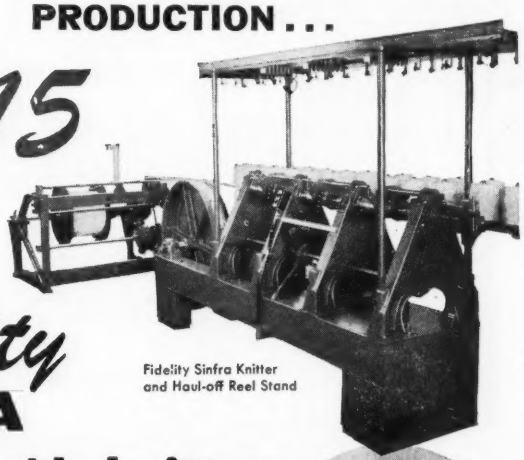
A UNIVERSAL CLASSIFICATION FOR WIRE SIZES AND GAUGES.
Anon. Wire Prod. 1952 Vol. 1 pp. 6-9, 23 (Jan.); abstr. Iron & Steel Inst. Journ. 1952 Vol. 171 (3) p. 328 (July).
After enumerating and describing the large variety of wire gauges in use, author points to merits of simplification and recommends metric gauge with arithmetic progression. Suggested that dia in micron should serve as gauge number.

★ ★ ★

ELECTRIC ARC DRILL
Elox Corp. New Equipment Digest 1951 Vol. 16 (10) p. 29 (Oct.).
M-7 Tapmaster Electron drill can

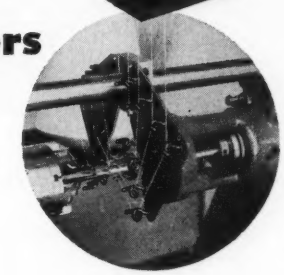
INCREASE YOUR BUILDING AND WEATHERPROOF WIRE PRODUCTION . . .

10-15 times with Fidelity SINFRA wire and cable knitters



Fidelity Sinfra Knitter and Haul-off Reel Stand

- Less Yarn Cost
- 15 Times Productive Output
- 600% Greater Labor Productivity
- Less Floor Space
- Lower Maintenance
- Lower Power Requirements
- Complete Automatic Control
- Minimum Noise
- Easier Working Conditions
- Accepted by ASA, AAR, UL, CSA
- Lower Capital Investment



Enlarged view of Knitting Head

The production of *one* FIDELITY SINFRA wire covering machine is equivalent to the capacity of 15 triple deck braiders! This impressive production achievement is made possible by the reliable and extremely high speed Fidelity Knitting Head, using stationary, large yarn cones.

The SINFRA Knitter is built to the precision standards long associated with Fidelity and is equipped with automatic electric stop motions, controlling both the wire and yarn supply. As the wire enters the SINFRA Knitter it is straightened by a unique straightening device before being passed through a series of 3 knitting heads.

SINFRA Knit is widely acclaimed as the most modern method of covering wire. Wire covered by SINFRA Knit is accepted by the American Standards Association, Association of American Railroads, Underwriters' Laboratories, Inc. and the Canadian Standards Association.

SINFRA Knitter is designed to permit horizontal operation at normal working level. No longer need your operators crawl or stretch to service wire covering equipment and noise level is reduced to a pleasing hum. Top companies have found their answer to production in SINFRA Knitters. Why not write for complete information on this development to lower your production costs and increase your productive capacity.

Write today for literature on this time and money saver.

Manufacturers of intricate precision machinery since 1911.

FIDELITY MACHINE COMPANY INC.

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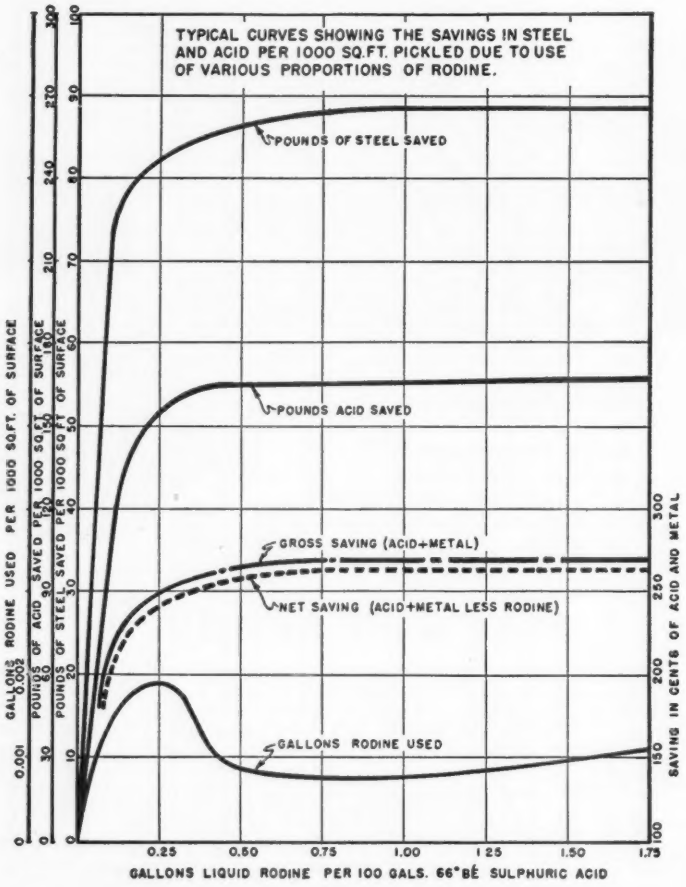
AMERICAN CHEMICAL PAINT COMPANY

AMBLER CHEMICALS ACP PROCESSES PENNA.

Technical Service Data Sheet

Subject: EFFICIENT PICKLING WITH "RODINE"®

A. SAVINGS POSSIBLE WITH "RODINE"


TYPICAL CURVES SHOWING THE SAVINGS IN STEEL AND ACID PER 1000 SQ.FT. PICKLED DUE TO USE OF VARIOUS PROPORTIONS OF RODINE.
POUNDS OF STEEL SAVED
POUNDS ACID SAVED
GROSS SAVING (ACID+METAL)
NET SAVING (ACID+METAL LESS RODINE)
GALLONS RODINE USED
GALLONS RODINE USED PER 1000 SQ.FT. OF SURFACE
POUNDS OF ACID SAVED PER 1000 SQ.FT. OF SURFACE
POUNDS OF STEEL SAVED PER 1000 SQ.FT. OF SURFACE
SAVING IN CENTS OF ACID AND METAL
0.25
0.50
0.75
1.00
1.25
1.50
1.75
GALLONS LIQUID RODINE PER 100 GALS. 66°BÉ SULPHURIC ACID

B. TYPICAL APPLICATION OF "RODINE"

Pickling shell cases in uninhibited muriatic or sulfuric acid contributes to their embrittlement and makes it difficult to draw them without breakage. By adding a small amount of "Rodine" to the pickle bath, embrittlement is suppressed and more than enough acid is saved to pay the costs of the inhibitor.

CHEMICALS ACP PROCESSES WRITE FOR DESCRIPTIVE FOLDER ON "RODINE" AND INFORMATION ON YOUR OWN PICKLING PROBLEM. CHEMICALS ACP PROCESSES

drill holes from 0.040 to 1 in. larger in hardened dies within 0.010 in. accuracy. It will cut and counterbore sintered carbide and, since electrode does not revolve but vibrates vertically, can drill square or hexagonal holes. 1 illustr.

★ ★ ★

BERECHNUNG VON ZIEHSTEINEINSAETZEN FUER MEHRFACHZIEHMASCHINEN. DETERMINATION OF DRAWING DIE INSERTS FOR MULTIPLE DRAWING BENCHES.
W. Lueg. Arch f Eisenhuettenw 1952 Vol 23 (3-4) pp. 91-101; abstr. Draht 1952 Vol. 3 (7) p. 211 (July) (In German).

Graph shows determination of 6 drawing die dia for working wire in 6 operations reducing area of cross-section by 26% per draw. If original wire dia was 5.5 mm, then die hole for last draw must be 0.405 x 5.5 = 2.23 mm. Second and third indicator lines show total area reduction after 6th draw to be 83.6% and that wire is now 6.1 times as long as before operation. Second graph applicable when ratio of cross-sectional area decrease per draw varies. Similar results can be obtained with slide rule equipped with log scale; practical examples given to demonstrate necessary slide operations. 2 illustr.

★ ★ ★

SOME FRICTION EFFECTS IN WIRE DRAWING.
G. D. S. MacLellan (Cambridge Univ.). Inst. Met. Journ. 1952 Vol. 81 (1) pp. 1-13 (Sep.).

Results of study of friction effects in wire drawing in general agreement with those of H. G. Baron and F. C. Thompson. G. Sachs' theory extended to include effect of cylindrical extensions to conical die channel, ie of so-called 'bearing.' Variation of coeff or friction with interfacial pressure insufficient to affect usefulness of theoretical analysis which neglects that variation. Values of coeff of friction resulting from theoretical analysis of backpull figures mostly range from 0.06 to 0.10. Without allowance for backpull effect, this range would be much greater. Allowance for parallel also explains presence of intercepts on curve of drawing force (or stress) as function of reduced area. Special case of split dies discussed, though in some respects this method unsatisfactory. In present work steel, tungsten carbide and diamond dies used. In further study of friction and lubrication effects, full regard to record of mechanical properties of wire and of die profiles very important. Latter can now be measured with BISRA die profilometer. Introduction of sintered carbide in place of steel dies eliminated need for appreciable length of bearing, though some present manufacturing methods seem to create them. Results of present work still tentative. 14 illustr., 21 ref., 3 tables.

★ ★ ★

HOW DRAW SPEED AFFECTS STAINLESS WIRE.
S. Storchheim (Sylvania Electr. Prod. Inc.) Am. Machinist 1952 Vol. 96 (15) pp. 124-125 (July 21).

Deformation of annealed 18-8 stainless steel at room temp. causes austenite to transform into magnetic martensite. Change is conditioned by chemical analy-

sis of melt, percentage of cold reduction of alloy, and dia. Austenite-to-martensite transformation is chemically retarded by nickel, manganese and carbon, promoted by chromium, silicon, molybdenum and columbium, and also by increased cold reduction area, though this applies to heavy rather than finer wires. Fluctuations in magnetic properties of wire occurring when mentioned factors kept constant found due to variations in drawing speed. Results of investigation at Wilbur B. Driver Co., Newark, N. J., with drawing speeds varying from 45 to 3,900 ft./min., tabulated and graphed. Property fluctuations probably caused by heat generation in wire during drawing.

★ ★ ★

THE WEAR OF WIRE-DRAWING DIES
J. G. Wistreich (Brit Iron & Steel Res. Assoc.) Brit Soc Rheol Bull 1952 (34) pp. 9-10 (Apr.).

Summary of paper to Soc., Jan. 4, 1952. Die is removed from service because tolerance limit on wire size is exceeded, or through scoring of wire surface. First cause of failure may be postponed by modification of die profile. As to latter, wear tends to proceed most rapidly near wire entry and exit. Formation of groove (ringing) near wire entry causes longitudinal scoring of die which ruins wire surface. By applying back pull of 70% initial yield stress and reducing die pressure by factor of 3, ring shape is modified and size reduced. Likely explanations of ringing are in terms of static failure of die material, or fatigue failure. Sintered tungsten carbide grains are plucked out of die, embedded in wire, and ploughed through die. Variability of die performance in industry and preponderance of short lives suggests wear is caused by inadequate lubrication; remedy may lie in improved lubrication. Little is known about lubrication in wire drawing; probably varies from dry friction to quasihydrodynamic lubrication. Die-wire interface temp. of about 600 deg. C reached even in cold drawing; solid substances, eg soaps and metallic or non-metallic coats, suitable.

★ ★ ★

150 YEARS OF WIRE-WEAVING: A HISTORY OF C. H. JOHNSON & SONS
Anon. Wire Ind. 1952 Vol. 19 (224) pp. 743,745, (Aug.).

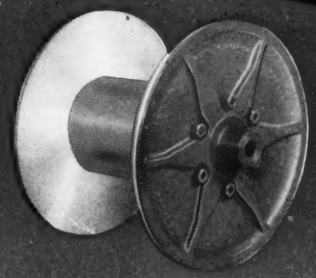
Oldest of 5 British firms engaged in wire weaving for paper making dates back to 1790. In 1860, C. Johnson's partner, J. Rowcliffe, began to anneal wire, permitting equal thickness for warp and weft, but using softer wire for this. Wire drawn through holes in metal block by hand-worked machinery. Diamond dies and automatic machinery introduced at end of 19th century. In 1904, firm installed first mechanical loom, imported from Germany. Progress in last 50 years from 1 to 3 ton hand looms to 60 ton mechanical looms, from 11 to 27 ft. max weaving width 40 to 100 ft. lengths. Firm's machinery stripped and overhauled under metallurgist, A. W. Paton: drawing speeds increased from 1,000 to 4,000 ft./min. since 1937.

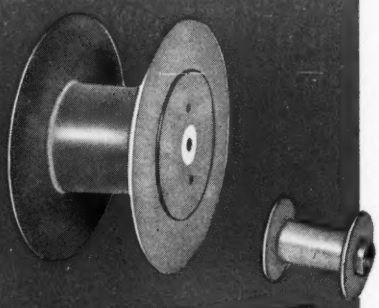
Ed. Note: These abstracts are published through the courtesy of the Industrial Diamond Information Bureau, London, England.

a name that has stood for sturdy, dependable yarn beams in the Textile Industry for over 20 years . . .

MILTON MACHINE offers you A RELIABLE SOURCE OF

RUGGED STEEL HEAVY DUTY PROCESSING REELS





HEAVY DUTY REEL

Shown at left is one of several wire rope or cable reels designed and manufactured over the past several years to meet the heavy duty service of a wire rope manufacturer. Flanges with rope brake rim grooves are heavily ribbed semi-steel castings.

WELDED STEEL REEL

At left is one of several welded reels made to wire rope manufacturers' specifications for replacement of light weight pressed steel reels which failed to hold up under heavy duty service.

SOLID STEEL PROCESSING SPOOLS & BOBBINS

Another of our products for the unusual service applications of the wire industry.

INQUIRIES INVITED . . .
Send us a sketch or print stating the limiting dimensions and services required—or write or phone. Our field engineer-representative will be glad to describe our facilities for supplying you with special heavy duty processing reels, spools or bobbins.

let's get acquainted..
SEND FOR BULLETIN 52-W

MILTON MACHINE WORKS, Inc.
DESIGNERS — ENGINEERS — MANUFACTURERS
MILTON • PENNA.

Outstanding Personalities of the Wire Industry

Jenter Appointed to New Post by A. S. & W.

Harry L. Jenter has been appointed to the position of assistant district manager for the **Cleveland District** of **American Steel & Wire Division,** it was announced recently by Albert J. Hoyt, district manager of this U. S. Steel Company Division.

★ ★ ★

Mr. Jenter was chief engineer of the Wire Division prior to his promotion. In his new post he will be concerned with the operations of Wire Division facilities in this area, including Cuyahoga Works, American Works, Central Furnaces and Docks and Coke Works, and Newburgh Works, with a total of nearly 4,500 employees. In 1917 he joined the Wire Division's Trenton Works as a draftsman, and for the next few years alternately worked for the Division and attended college. In 1926 he was graduated from Syracuse University with a degree in mechanical engineering.

Appointed to Southeast Territory

George D. Wick III, formerly in Youngstown district sales office of **The Youngstown Sheet and Tube Company,** now is representing the company at Charlotte, N. C. He succeeds Clarence D. Holland, who died last June.

★ ★ ★

Mr. Wick is a native of Youngstown.

★ ★ ★

He joined The Youngstown Sheet and Tube Company in 1947 as a time study man in the Industrial Engineering Department. Two years later he became a sales student and in June, 1950, was assigned to the Youngstown district office as a salesman.

★ ★ ★

The Charlotte territory operates out of the Atlanta, Ga., district office, of which D. W. Martin is manager.

Edwin C. Smith

Edwin C. Smith a Director of the **Wardwell Braiding Machine Company** since its incorporation in 1911 and Treasurer of the company for the past 26 years, died on October 24, 1952. He was a graduate of Massachusetts Institute of Technology and a man skilled in

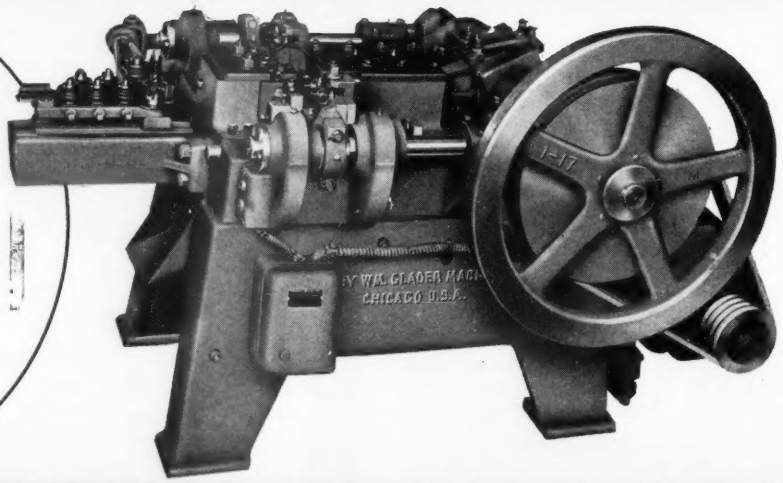
GLADER

HIGH SPEED WIRE NAIL MACHINES

HIGH TONNAGE OUTPUT—LOW MAINTENANCE COST

You can take care of increased production schedules and better product demands with these machines of established reputation.

For 55 years GLADER MACHINES have been giving HIGH QUALITY, LOW COST nail production.



Wm. Glader Machine Works 210 N. Racine Avenue Chicago 7, Illinois

Export Dept.: 122 E. 42nd STREET, NEW YORK 17, N. Y.

the design and manufacture of precision built machinery. During his long connection with this corporation he gave sound advice and counsel with respect to both the financial affairs of the company and to its management and supervision of its personnel. His presence will be greatly missed by all of his associates.

Changes Announced by Russell, Burdsall & Ward

Lambert M. Kaspers has been appointed manager of the Coraopolis, Pa., plant of **Russell, Burdsall & Ward Bolt & Nut Co.** and **Aaron Evans** named Detroit sales manager for the company. Mr. Kaspers replaces **Matthew L. Douglas,** retired, and Mr. Evans succeeds **Alfred Fairfield,** who also recently retired.

Becomes Resident Manager of Okonite Unit

Raymond Manson Eaton, superintendent and resident manager of the **Hazard Insulated Wire Works Division** of the **Okonite Company** at Wilkes-Barre, Pa., retired on December 31st.

★ ★ ★

He was succeeded as resident manager by **David W. Nurse** who had been factory sales manager. He came to Wilkes-Barre from the company's sales office in Portland, Ore.

Made Manager of Chase Brass' Philadelphia Branch

The office of the **Chase Brass & Copper Company** has announced the appointment of **Willard M. Brown** as district manager of its Philadelphia, Pa., branch office. Mr. Brown succeeds Alan P. Kirk, who recently resigned.

★ ★ ★

Mr. Brown, a graduate of Ohio State University in 1916, was formerly superintendent of the casting shop of the Detroit Copper and Brass Rolling Mill. From 1921 to 1927 he served as the company's chief metallurgist.

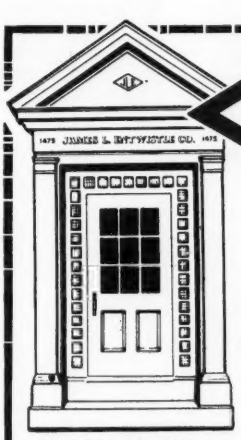
★ ★ ★

Mr. Brown's assignment and transfer to Philadelphia was formally made by Leland S. Hanson, Eastern regional manager of Chase Brass.

Appointed to Executive Post by Lincoln Electric

J. S. Roscoe has been appointed executive vice president in charge of business administration of the **Lincoln Electric Company** in Cleveland. **William Irrgang,** who was appointed executive vice president in October, 1951, is in charge of all manufacturing.

Mr. Roscoe has been with Lincoln since 1924 when he was graduated from the Ohio State University with a degree in electrical engineering. He has been director of purchasing since May, 1951. Prior to that he was in the company's sales engineering department in various sections of the country. He has been district manager for Lincoln in Syracuse, N.Y.; Pittsburgh, Pa. and Chicago, Ill.



JLE

SERVING THE WIRE INDUSTRY THROUGHOUT THE WORLD

- Caterpillar Pull-outs
- Standard Sets of Spark-Testing Equipment
- Take-ups and Re-spoolers
- Reelers
- Coilers
- Spoolers
- Collapsible Coiling Reels
- Wire Sparkers and Accessories
- Hand Locators
- Electrode Units and Stands
- Measuring Machines, Counters and Accessories
- Wire Guide Units
- Pay-off Reels Stands
- Electronic Devices
- Shaftless Take-ups and Payoffs
- Wire Pre-Heater
- Disk Brakes and Controls, Drag Units and Slip Clutches
- Wire Marking Machines, Type Strips, Inks
- Labelling Machines
- Pneumatic Equipment and Controls
- Special Machinery for the Wire Industry
- Hydraulic Equipment and Controls
- Hi-Pot Test Sets
- Cable Handling Equipment for Warehouse Use

See page 28 for News of JLE "High Speed Twister"

JAMES L. ENTWISTLE CO.

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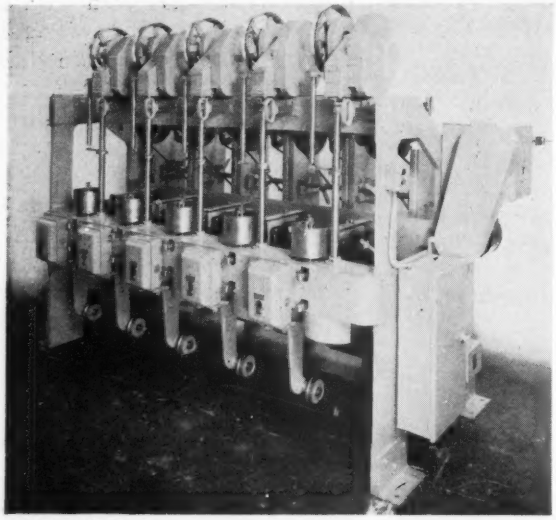
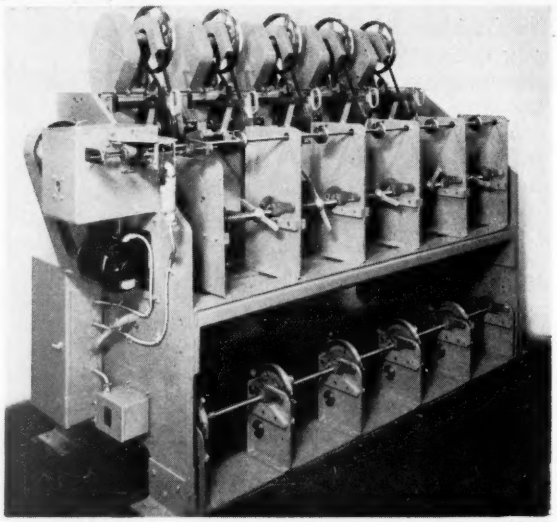


FRONT VIEW



REAR

#2S-5-MBB INSULATION WINDING MACHINE

APPLIES SINGLE COVER TO 5 LINES OF WIRE SIMULTANEOUSLY. NOMINAL WIRE RANGE #15 TO #25 B & S GAUGES (.057" TO .018" OR 1.450 TO .455MM). STANDARD CAPSTANS 8" DIAMETER, BUT MACHINE ILLUSTRATED IS SPECIALLY ARRANGED WITH 12" DIAMETER CAPSTANS, IN PLACE OF STANDARD 8", FOR HEAVIER WIRES. SUPPLY WIRE LET-OFFS AND TAKE-UPS ARE AT REAR OF MACHINE.

EST. 1855 AIMCO INC. 1915

"American" AIM INSULATING MACHINERY COMPANY

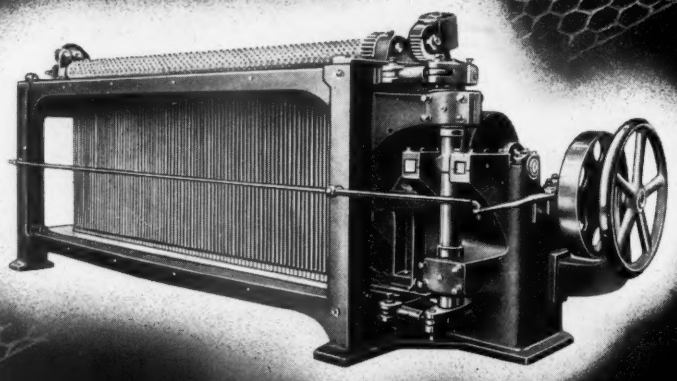
REG. U.S. PAT. OFF.

FAIRHILL AND HUNTINGDON STREETS

PHILADELPHIA 33 PENNSYLVANIA U.S.A.

We build again: Hexagon Wire Netting Machines

Mesh widths 3/8" - 4"
Working widths 3' - 12'
for wire BWG 22 - 13½



Model TUDN

SINCE MALMEDIE 1873

MASCHINENFABRIK GMBH DÜSSELDORF / GERMANY

During the 28 years Mr. Roscoe has been active in the arc welding field, he has pioneered the application of welding in many industries. One of his early developments was the application of automatic carbon arc welding of copper cooling fins to cylinders for air-cooled automobile engines. He also established the procedures for welding the first all-welded freighter on the Great Lakes.

Made Assistant General Sales Manager by Firth Sterling

Firth Sterling, Inc., has announced the appointment of **John S. Roller** as Assistant General Sales Manager. He was formerly Vice President and General Manager of The Method X. Company, a Firth Sterling affiliate devoted to the research and development of an electro-mechanical process of machining heretofore unmachinable materials. Recently the Method X manufacturing rights have been sold to a nationally known manufacturer, thereby permitting Mr. Roller to take up these broader duties.

★ ★ ★

Prior to his association with the Firth Sterling organization, Mr. Roller was General Manager of Sales of Republic Supply Company in Houston, Texas.

★ ★ ★

After attending Columbia University and New York University, he spent sixteen years with Republic Steel Corporation, where he was Assistant Manager of Sales in their Southern District before entering the service. In World War II, he was a Lieutenant Colonel in the Office of Strategic Services, serving in Italy, North Africa, England, France, and Germany.

Aetna-Standard Appoints Pacific Coast Representative

The Aetna-Standard Engineering Company, Pittsburgh, Pennsylvania, announces the appointment of **W. G. "Guy" Hoffman** as West Coast Representative, with offices located in San Mateo, California.

★ ★ ★

In January, 1936, he was appointed Superintendent of Construction of the Gary Sheet Mill, Gary, Indiana. In July of the same year he become Chief Engineer at Gary. Mr. Hoffman was appointed Division Superintendent of the Gary Tin Mill Division in January, 1939, and in March, 1948, he went to the Pittsburgh office of the Carnegie-Illinois Corp., where he was placed in charge of properties. November, 1950, he was made Chief of Staff of Operation Consulting Engineering Bureau. He served in this capacity until his retirement in 1951, completing a 50-year service record with U. S. Steel.

Made Chief Designer by Loewy

G. Krause has been appointed Chief Designer of **Loewy Construction Co.,** subsidiary of Hydropress, Inc., New York, in charge of the U.S.A.F. Heavy Press Program.

Appointed Eastern Manager for the Ironsides Company

Hubert W. Brush has been appointed Eastern Manager by the **Ironsides Company,** succeeding the late George B. Thurston. His long experience with the Western Electric Company qualifies him for the responsibilities of this work.

PITTSBURGH, STEEL CAPITAL OF THE WORLD,

IS ENJOYING TREMENDOUS GROWTH. SHOWN HERE IS PITTSBURGH'S GOLDEN TRIANGLE OF THE FUTURE

KEEPING PACE WITH PITTSBURGH'S PROGRESS IS THE PARKIN CHEMICAL COMPANY. PRODUCING BETTER ACID INHIBITORS, PICKLING COMPOUNDS, AND ACCELERATORS FOR STEEL PICKLING, THE PARKIN CHEMICAL COMPANY IS SERVING THE STEEL CAPITAL AND THE REST OF THE NATION'S STEEL MILLS. WE PRODUCE THE RIGHT COMBINATION FOR LOW COST PICKLING OF STEEL.

REMEMBER THOSE PERFECT PARTNERS FOR PICKLING

NEP INHIBITOR AND SUMFOAM COMPOUND

We Solicit Your Inquiries.

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PITTSBURGH 6, PENNA.

PICKLING SPECIALISTS
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IN STEEL SINCE 1860

Proven by wide usage—greater efficiency in **Serving and Braiding** *when packages of* **Silk-Nylon-Acetate** *are the product of our* **Mills.**

Producers also of **Tracer and Marker Trams** *which meet the* **Underwriters' Laboratory** *specifications.*

Consult us on your specific problems.

Belding Heminway *"Over a Century of Leadership"*

Industrial Yarn Division **1407 Broadway, New York 18, N. Y.**

The Federal Manufacturing Company

Extends to its many friends in the Wire Industry its best wishes for a

Prosperous and Happy New Year

We take this opportunity to thank you, our customers, for your patronage and to pledge you our continued best efforts to make Federal Equipment worthy of your future confidence.

FEDERAL EQUIPMENT

PAY-OFFS
TAKE-UPS
CAPSTANS
DOUBLE TAKE-UPS

Federal Manufacturing Co.
SPECIAL WIRE MACHINERY
236-240 Hall Avenue, Wallingford, Conn.

A Review of Recent Wire Patents

No. 2,616,410, UNIVERSAL WIRE DIE MACHINE, patented November 4, 1952, by Frank M. Potter and Robert M. Hartman, Rome, N. Y., assignors to General Cable Corporation, New York, N. Y., a corporation of New Jersey.

More specifically, the machine is for the manufacture of wire-drawing dies wherein an abrasive medium is applied to the point of the rotating needle-like drill. There are sixteen claims.

★ ★ ★

No. 2,616,478, METHOD AND APPARATUS FOR FORMING SAWING WIRES, patented November 4, 1952, by Pierre de Vitry d'Avaucourt, Bainbridge, Pa.

In this method of forming sawing wire from a single flat metal ribbon of high tensile strength steel, the steps comprise holding the ribbon against free rotation at spaced points, imparting a motion of rotation to the ribbon at a point intermediate these spaced points to impart to the wire a helical twist throughout the length of the ribbon between these spaced points with the helix of one portion from the intermediate point to one of the spaced points being of one hand and the helix from the intermediate point to the other of the spaced points being of the opposite hand, and applying gradually diminishing yielding tension to the ribbon during the twisting thereof.

★ ★ ★

No. 2,616,684, CORD SPRING, patented November 4, 1952, by Max H. Richter, Chicago, Ill.

A cord spring is provided, composed of a plurality of turns of coiled wire close spaced at the ends and connected by loose-spaced coils between the ends, the turns at one end forming a close-spaced flange-like projection for attachment of the coil spring to a suitable support, close-spaced turns at the other end forming a ferrule with an inner wire opening, and an outer turn extending from the end inwardly leaving a space between two turns of wire adjacent the extremity approximately the diameter of the wire into which the end turn of the wire including the extremity of the wire is partially seated.

★ ★ ★

No. 2,616,780, METHOD OF PREPARING ELECTRIC CABLE FOR SHIPMENT, patented November 4, 1952 by Ralph W. Atkinson, Westfield, and Oscar G. Garner, Bayonne, N. J., assignors to General Cable Corporation, New York, N. Y., a corporation of New Jersey.

In preparing a non-leaded but paper-insulated wire cable for storage and shipment, the inventors reel the cable on a water-tight reel, cover the reeled cable with a blanket of flexible material which is impervious to moisture, seal the ends of the blanket together and the edges thereof to the reel heads, covering the reel with a strong weathertight covering which affords mechanical protection to the blanket, and fill the reel with dry inert gas.

No. 2,617,123, SPRING CONSTRUCTIONS, patented November 11, 1952 by Louis T. Mayer, Detroit, Mich., assignor to No-Sag Spring Company, Warren Township, Mich., a corporation of Michigan.

Associated hook and eye wire portions are provided at the tops of the wire coils for interconnection of the coils and connection to an eyed border wire to receive some of the hooks of the coils.

★ ★ ★

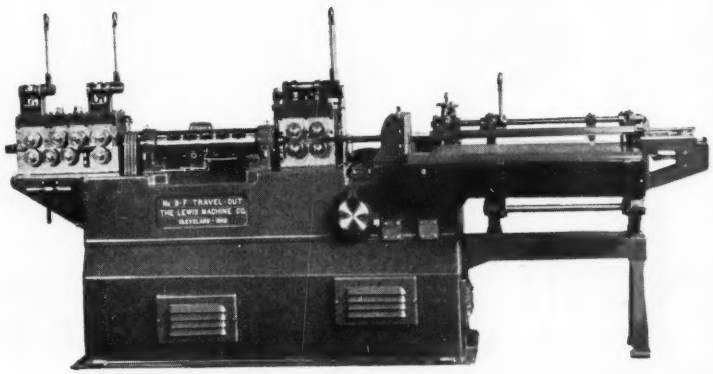
No. 2,617,124, SPRING UNIT FOR MATTRESSES, CUSHIONS, AND THE LIKE, patented November 11, 1952, by Gustave P. Johnson, Waukegan, Ill.

Upper and lower spring wire helicals of different gauge material are connected to the main coiled springs of the

Fast, Accurate, Economical

STRAIGHTENING and CUTTING

with LEWIS TRAVEL-CUT



22 Models to handle from 1/16" to ¾" Round, Hex, Flat, Shapes.

Simple in design, rigid in construction, Lewis TRAVEL CUT will deliver continuous dependable service under the most severe, high production conditions—day in, day out. Feeds wire from the coil, straightens accurately, gauges to uniform length, and cuts clean without stopping the wire. For steel, brass, aluminum and alloy wire. Cut your cutting costs with the Lewis TRAVEL CUT. Full details on request.

Exclusive Representatives

EAST: Penn Machinery Co., 117 North Third Street, Philadelphia 6, Penn.

MIDDLE WEST: Steel & Wire Machinery Co., 15457 Euclid Ave., Cleveland 12, O.

CENTRAL: Moslo Machinery Co., 2443 Prospect Avenue, Cleveland 15, Ohio.

WEST COAST: Hoffman & Heartt, 3005 So. Grand Ave., Los Angeles 7, California.

CANADIAN: Empire Engineering Co., 11 Wellington St. E., Toronto 1, Ontario.

CONTINENTAL EUROPE: Gaston E. Marbaix Ltd., Devonshire House Vicarage Crescent, London S. W. 11, England.

The LEWIS MACHINE Company

3441 E. 76th Street, Cleveland 27, Ohio

Also agents in Paris, Stockholm, Rotterdam, Brussels, Zurich, Milan, Bombay and Melbourne

structure in such a manner that the top of the spring structure will be more yielding than the bottom thereof and better adapted to support comfortably a person of light weight.

★ ★ ★

No. 2,617,605, CONDENSER WINDING METHOD, patented November 11, 1952, by Felix Weiss, Brookline, Mass., assignor to Cornell-Dubilier Electric Corporation, a corporation of Delaware.

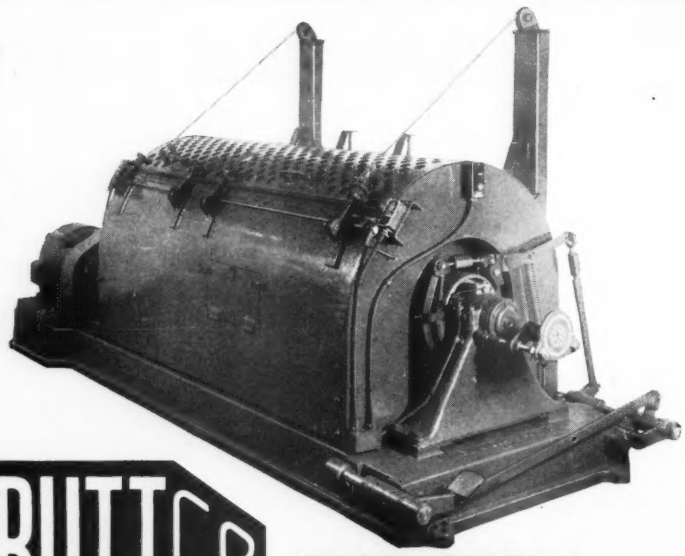
The method of forming a condenser comprises supplying inter-leaved strips of insulating and conductive material, engaging and rotating the ends of these insulation strips to wind the inter-leaved strips into roll form, completing the winding of the strips into roll form, moving the wound roll bodily to a predetermined second station, and positively feeding the interleaved strips of the supply forward at a predetermined rate during the movement of the roll to control the tension of the strips.

No. 2,618,440, WINDING MACHINE, patented November 18, 1952 by Benjamin B. Scott, George F. Greene, and Frank E. Valentine, Schenectady, N. Y., assignors to General Electric Company, a corporation of New York.

The machine includes a lead screw for moving the wire feeder, and a gear driving connection between the screw and a driving means, including a variable speed ratio gearing adjustably settable for stepless variation of the speed ratio for moving the feeder at a speed settable between predetermined limits to feed the wire to the support in a predetermined spaced turn relation, the variable speed ratio gearing being constructed to maintain the predetermined speed relation between the support and the lead screw for synchronous acceleration and deceleration of the support and wire feeding means during the starting and stopping of the winding operation.

No. 2,619,306, FLAT WIRE CONVEYER BELT, patented November 25, 1952, by Carmen J. Van Lake, Waukegan, Ill., assignor to United States Steel Company, a corporation of New Jersey.

Flat wire links are provided, bent to form meshes extending across the width of the belt, with pintle rods of special shape, connected thereto.



NEBUTTCO

HIGH SPEED BUNCHER

For fast, economical twisting of small wires, you can't beat the Nebuttco High Speed Buncher. Incorporating many unique features, this machine gives you maximum output per hour at minimum operating cost.

- 1600 twists per minute
- Accommodates reels up to 24" dia. x 12¾" O.A. width with reel arbors 1¼" dia. to 5" dia.
- Large double drum grooved capstans
- Easy change of lay and reverse direction through convenient change gears
- Easy threading and reel change
- Low center of gravity, balanced rotor and heavy cast iron bed assure continued operation without vibration
- Filled reel automatically stops machine
- Supply spool stop motion can be interlocked to stop Buncher automatically

Nebuttco High Speed Bunchers are made in two sizes: S-31 for strands up to No. 14; S-35 for strands up to No. 8. For further details write for Circular No. 63.

NEW ENGLAND BUTT COMPANY

1842

304 PEARL STREET • PROVIDENCE 7, R. I., U. S. A.

JAMES DAY, MACHINERY LTD., 28 MADDOX ST., LONDON, W-1, ENGLAND

New Water Resistant Case Liner Adhesives

Fast initial tack, retack and long "open time" are features available in a series of newly designed water-emulsion adhesives announced by **Paisley Products, Inc.** Chicago and New York City. They were developed by the Paisley Laboratory for application to seams in the manufacture and in the final closure of water-proof paper bags, wraps and case liners to meet the requirements of the new Military Specification MIL-A-140A, (which supersedes JAN-P-140 specification).

★ ★ ★

In addition to their use in military depots, arsenals, and for contractors and vendors to the Armed Services, the new features make these adhesives useful for all domestic and export packaging of non-military goods which require protection against the elements. The adhesives can be applied by machine or by hand brushing.

★ ★ ★

Water-emulsion adhesives are listed as Class 2 in the Military Specifications, suitable as Grade A and Grade B for subsistence and non-subsistence items. Tests conducted by the manufacturer indicate the adhesive has fungi resistance, low temperature flexibility at zero degree F. and resistance to water penetration of 8 hours minimum. Strong bonding of water-proof barrier materials, after water immersion tests and heat aging, is reported well within specification limits. The initial tack on machine and hand applications conform to normal machine speeds and timing of fabricating and assembling operations. The long "open time" available affords efficient handling of large unwieldy bags and case liners.

Hamilton Watch Plans Diversified Production

A stepped up research program to achieve greater product diversification was announced by **Hamilton Watch Company,** Lancaster, Pa., Tuesday, November 11th. **Arthur B. Sinkler,** vice president in charge of manufacturing, reported that **Lee Devol,** recently deputy chief of physics research at the Naval Ordnance Laboratory, Silver Spring, Maryland, joined the Hamilton staff on November 1st to direct this program, anticipating the day when the company's defense-expanded production capacity will be returned to normal peacetime conditions. Mr. Devol brings to Hamilton a fund of research know-how in fields outside of horology and its associated sciences—knowledge that materially extends and augments Hamilton's present extensive scientific research facilities.

★ ★ ★

G. E. Shubrooks, according to Mr. Sinkler's announcement, will continue in his present post as manager of Hamilton's research laboratory. He also continues technical direction of the existing four scientific laboratories in the company's new research building which he has helped develop over the past 20 years.

★ ★ ★

Ralph B. Mentzer was named assistant research director under Mr. Devol and **Russell E. Philip** will be assistant manager of research under Mr. Shubrooks.

★ ★ ★

G. E. Shubrooks joined Hamilton as chief chemist in 1926 after prior service with Lancaster (Pa.) Steel Products Company, General Motors, and Burnham Boiler Corporation, Lancaster, Pa. He has since directed research leading to the establishment of Hamilton's present metallurgical and crystal tool laboratories and the metals processing and mainspring manufacturing sections. He was appointed manager of the research laboratories last April 1st.

Belden Marks its Half Century Birthday

In a special issue of "Beldenews", the **Belden Manufacturing Company** of Chicago, Illinois, has outlined the growth of the company from its modest beginnings in 1902 down to the present day.

★ ★ ★

Histories of the principal executives are given along with a description of the present plant, its operations and its production.

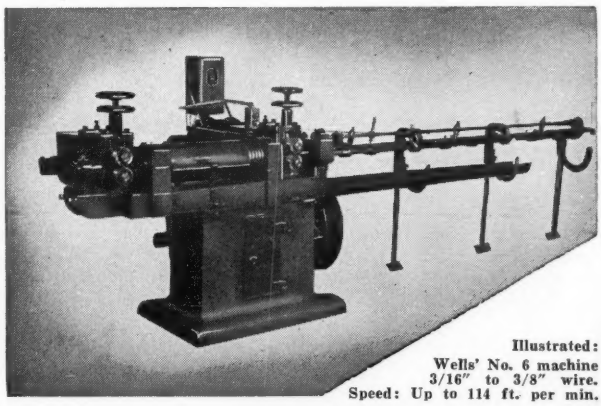
The company is to be congratulated for this fine saga, which records for posterity the history of the company and pays tribute to the men who have been responsible for its success.

Marvinol Production to be Doubled

Naugatuck Chemical Division, United States Rubber Company, has announced that it is doubling the production capacity of its Marvinol vinyl resin plant in Painesville, Ohio.

STRAIGHTEN and CUT SMALL WIRES

ON FAST, DEPENDABLE WELLS' AUTOMATIC ROTARY MACHINES



Illustrated: Wells' No. 6 machine 3/16" to 3/8" wire. Speed: Up to 114 ft. per min.

THIS MACHINE WILL CUT wire accurately and fast in any length from 7½" up to 25', but must be ordered for the maximum lengths to be cut.

The straightener flier runs in ball bearings. Has 2 H. P. motor arranged for direct drive. Drive gears are located inside of the base. Illustration shows the flier and drive open to show mechanism.

Furnished with 2 sets of hardened tool steel dies.

WELLS' machines are backed by 58 years of experience and of constant effort to improve their efficiency.

The result for you is a line of straightening and cutting machines that will handle the toughest jobs, day in, day out, year in, year out, with little or no servicing. Customers report uniformly high satisfaction with the operation of their WELLS equipment.

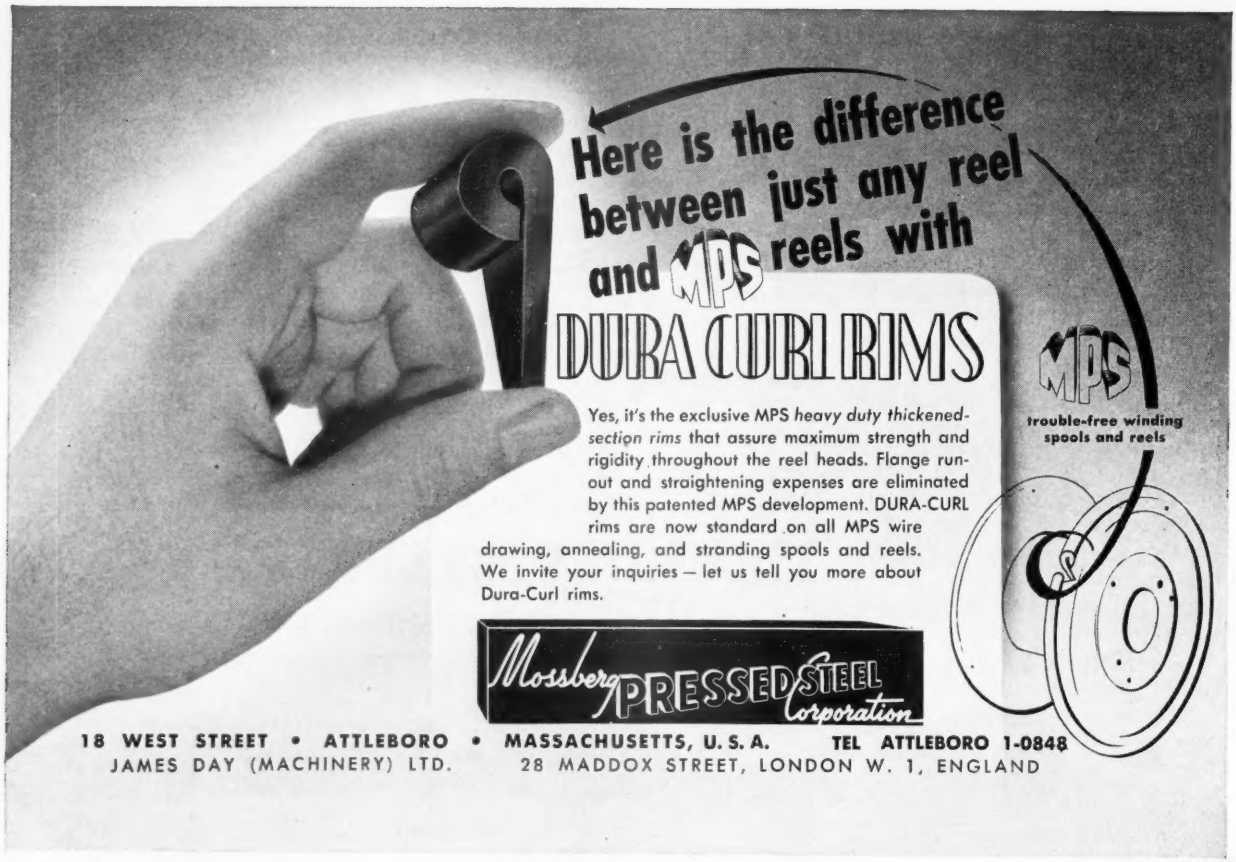
Built in a complete range of sizes for all wire gauges.

send for Catalog No. 50 covering the full line.

Frank L. Wells Company

KENOSHA • 5821 Fifth Avenue • WISCONSIN

Builders of Fine Wire Working Machinery


Here is the difference between just any reel and MPS reels with
DURA CURL RIMS
Yes, it's the exclusive MPS heavy duty thickened-section rims that assure maximum strength and rigidity throughout the reel heads. Flange run-out and straightening expenses are eliminated by this patented MPS development. DURA-CURL rims are now standard on all MPS wire drawing, annealing, and stranding spools and reels. We invite your inquiries — let us tell you more about Dura-Curl rims.
MPS
trouble-free winding spools and reels
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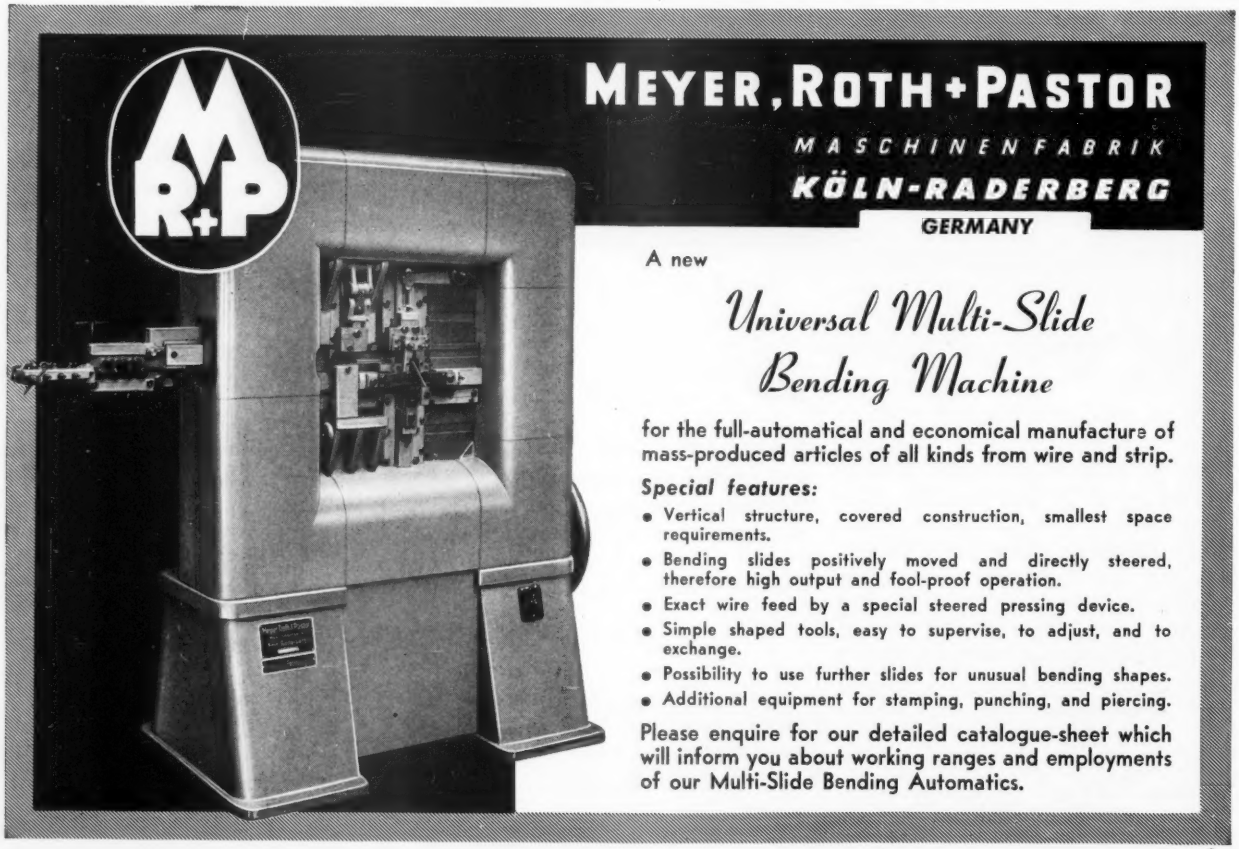
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A new
Universal Multi-Slide Bending Machine
for the full-automatical and economical manufacture of mass-produced articles of all kinds from wire and strip.
Special features:
• Vertical structure, covered construction, smallest space requirements.
• Bending slides positively moved and directly steered, therefore high output and fool-proof operation.
• Exact wire feed by a special steered pressing device.
• Simple shaped tools, easy to supervise, to adjust, and to exchange.
• Possibility to use further slides for unusual bending shapes.
• Additional equipment for stamping, punching, and piercing.
Please enquire for our detailed catalogue-sheet which will inform you about working ranges and employments of our Multi-Slide Bending Automatics.

The expansion program, which is expected to be completed by June, 1953, will lift production to more than 50,000,000 pounds annually.

★ ★ ★

"Vinyl plastics have been one of the fastest-growing segments of the plastics industry and we have every reason to believe that their spectacular growth will continue," John P. Coe, vice president and general manager of the division, said.

★ ★ ★

Rigid types of vinyl plastics are being introduced for the manufacture of pipe, electrical conduit, wire insulation and other large volume industrial products. Foam vinyl plastics for the manufacture of cushioning, life rafts and vinyl welting for shoes, are still other fields which represent volume potential for the industry.

★ ★ ★

In addition to expanding its resin capacity, Naugatuck Chemical has been conducting an intensive research and development program aimed at new, more efficient types of vinyl resin for the plastics industry. Production facilities for these resins are being included in the Painesville expansion program.

★ ★ ★

Tangible results of this development program include: the introduction in 1950 of Marvinol VR-20, an electrical grade resin which also offers easy processing characteristics for the calender field, a new straight polyvinyl chloride resin called Marvinol VR-21 which offers the industry a resin having the processing characteristics of the copolymers and retains the desirable end product properties of straight polyvinyl chloride resins; and four new rigid compounds for the manufacture of plastic pipe and extensive industrial applications.

★ ★ ★

Additional resins, such as new dispersion and dry blending resins, are now in the experimental stage and will be introduced by Naugatuck in the near future.

Alcoa to Build New Product Plant

Aluminum Company of America has announced its plans to build a modern new fabricating plant in the Lancaster (Pa.) area for production of aluminum screw machine products, fasteners, rivets and nails.

★ ★ ★

The plant, whose cost would be in excess of $3,000,000, is expected to employ 350 men and women initially. More may be added later.

★ ★ ★

Alcoa's production of screw machine products, fasteners, rivets and nails—vital for both defense and civilian uses—now comes from a section of its Edgewater, N. J., plant.

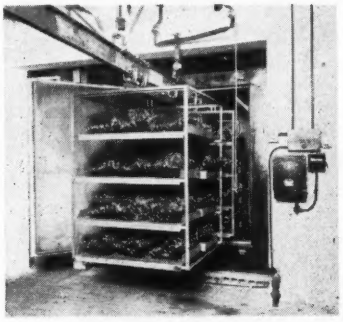
★ ★ ★

The operations to be relocated in Lancaster would make room for a planned expansion of Edgewater's aluminum sheet, impact extrusion and foil production facilities.

★ ★ ★

OVENS - OVENS - OVENS

LARGE
MEDIUM
and SMALL
•
GAS, OIL
ELECTRIC or
STEAM HEATED



Spring tempering and enamel baking oven.

Annealing
Preheating
Normalizing
Drawing
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Paint Baking
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Batch Type or Continuous

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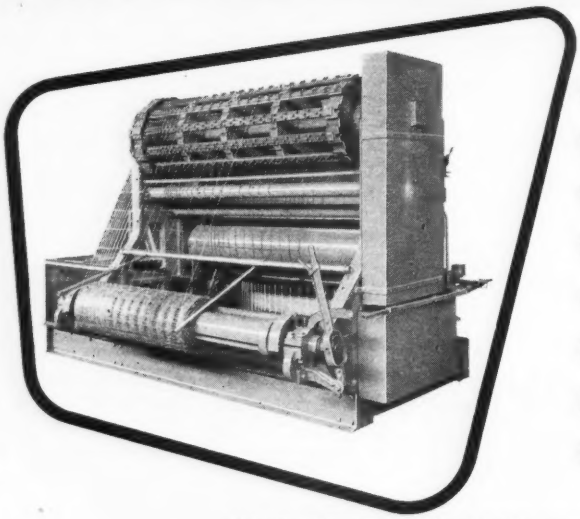
Interlocking FENCE LOOMS



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- Low Maintenance Cost
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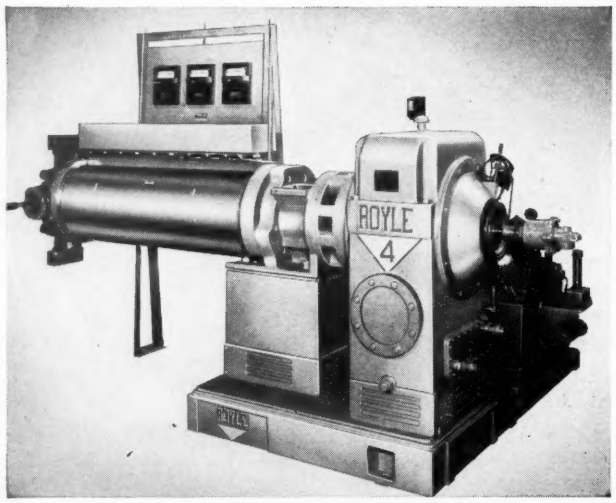
*SPIROD** EXTRUDERS

Built by America's oldest builders of extruding machines Royle Spirod extruders are the result of more than seventy years experience in the design of extruding machines. Time tested and proven features are built into Royle Spirod extruders to assure maximum productivity at minimum operating cost. These features include: Heavy steel members without flanges . . . Spirally installed rod type heating elements to provide faster, steadier, more evenly distributed heat . . . Complete insulation of cylinder and head to reduce heat loss with substantial power savings . . . Separate heating zones controlled by proportioning instruments.



CHECK THESE FEATURES that assure profitable and trouble-free production of such items as plastic insulated wire, flexible and rigid pipe, plastic sheeting, plastic clothes line, to mention a few of the products that are produced daily with Royle Spirod extruders.

*Patent Applied for

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PIONEERED THE CONTINUOUS EXTRUSION PROCESS IN

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PATERSON 3, NEW JERSEY

North Anson Reel Co.
Canada Reels, Ltd.

Although for years a traditionally agricultural country, Canada has become a full-fledged industrial nation in the past decade. It now ranks fourth in world trade and sixth in industrial output. Financially, Canada owns the world's most valuable dollar, and its government's budget is not only balanced but shows a surplus.

★ ★ ★

The end of Canada's extraordinary growth is by no means yet in sight. No other country enjoys its combination of natural resources and sources of hydroelectric power. Leduc, Kitimat, Uranium City, the St. Laurence Seaway, Ungava, "et al" are striking reminders of present and future development and expansion.

★ ★ ★

Demands on the Canadian wire and cable industry, as a result of the nation's rapid growth, have been great and production has been high to keep pace. The high rate of production naturally requires a great quantity of packaging materials, and chief among them is cable reels. There is a demand for reels of all types, many of which were not heretofore manufactured in Canada.

★ ★ ★

Since the end of World War II, the North Anson Reel Company has been interested in making reels for the Canadian wire and cable industry. Duty, freight and, for a time, monetary exchange rates made it practically impossible for Canadian companies to purchase their reel requirements in the United States. The only apparent solution was the establishment of a reel manufacturing plant in Canada, and **Canada Reels, Ltd.,** was formed at Bury, Quebec.

★ ★ ★

The counterpart of **Canada Reels, Ltd.,** in the United States is the **North Anson Reel Company** of North Anson, Maine.

★ ★ ★

The North Anson Reel Company began making cable reels in 1909 and has confined its production almost entirely to reels since that date. As with any company specializing in the production of a particular product, they have become well-acquainted with the requirements peculiar to cable packaging, and have been instrumental in initiating and developing many improvements. Its equipment and methods of production resulting from 3 years of manufacturing reels rank with the finest. With this background, officials at North Anson felt they were prepared to furnish products and services of value to the Canadian wire industry.

★ ★ ★

The decision to form a reel company in Canada was made early in 1952 and it was hoped production would start in the fall. It became apparent at an early date that many obstacles would have to be overcome to accomplish this. Trained personnel and specialized machinery necessary for straight-line reel production were not immediately available. A suitable

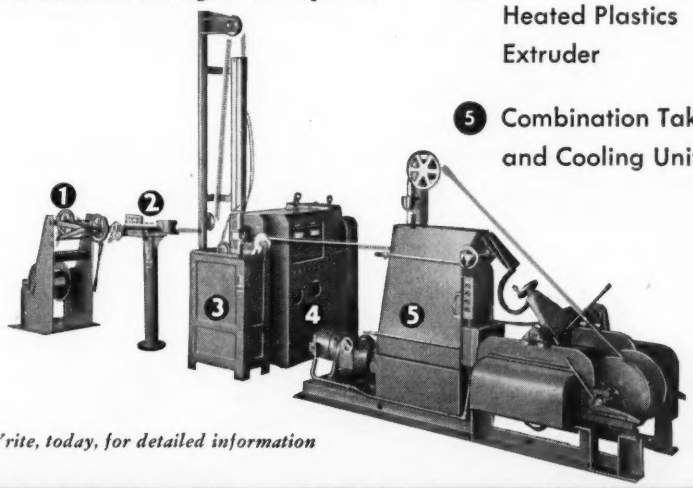
NRM

COMPLETE EQUIPMENT FOR COVERING WIRE WITH NYLON . . . . . .

Here's a "straight-line" production unit especially designed to give you faster, better covering of wire with Nylon. From the sturdy supply stand to the combination take-up and cooling unit, this NRM equipment is tailor made to give you the maximum output of accurately centered, smoothly covered wire at a minimum of cost and maintenance. A special metering type "torpedo" feed screw, a special Nylon crosshead, and extremely uniform heating are combined in a rugged 1½" electrically heated extruder to eliminate "pulsation" and to cover small gauge wire at high speeds and to close tolerances.

What's more, with a few simple changes this same equipment can be used with other wire covering plastics. The extruder, with built-in "Balanced Heat Control", need only be fitted with a different feed screw to handle a wide range of thermoplastics.

1. Supply Reel Stand
2. Wire Straightener
3. Vertical Wire Preheater and Cooling Tank
4. 1½" Electrically Heated Plastics Extruder
5. Combination Take-up and Cooling Unit



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2012

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Export: Omni Products Corp., 460 Fourth Ave., New York 16, N. Y.

Creative Engineering

plant and adequate sources of inventory materials had to be located. All the details of establishing an entirely new plant required completion in a relatively short period.

★ ★ ★

By mid-November, the factory was completed, and the first reels were made at Bury. It is equipped with the most modern facilities for manufacturing reels of all types.

★ ★ ★

For the first time in Canada, wood-metal reels for magnet wire from 12″ to 30″ diameters and metal-bound shipping, shop and process reels from 12″ through 54″ in diameter will be available. All-wood reels of all types, knocked-down or assembled, can be obtained in any size. New type pressed metal bushings, painting, waterproofing, stamping or stencilling will be furnished as required.

New Device for Accurate Automatic Control of Furnace Atmospheres

The Research Department of Lindberg Engineering Company has released data on the newest development, a device to automatically control and record the carbon potential of furnace atmosphere.

★ ★ ★

The Lindberg Carbotrol is a proportioning instrument which enables the heat treater to set his atmosphere or furnace in equilibrium with any steel.

★ ★ ★

The new Lindberg Carbotrol has been demonstrated for the first time at the 1952 Metal Exposition in Philadelphia, October 20-24.

★ ★ ★

It is said that the new instrument is now being subjected to extensive field application tests and should be ready for production in approximately six months.

★ ★ ★

For a technical report on the new Carbotrol, write to Lindberg Engineering Company, 2540 West Hubbard Street, Chicago 12, Ill.

Reliance Moves Newark Office

Removal of the Newark, N. J., sales office of the **Reliance Electric & Engineering Company,** Cleveland, Ohio, manufacturers of motors and motor drives, from its present location at 1060 Broad Street into newer and larger quarters at 535 High Street in Newark is announced by Elwood H. Koontz, branch manager for Reliance in this area.

★ ★ ★

Mr. Koontz said that the move will enable Reliance to broaden the availability of the company's sales application engineering services to users of A-c. and D-c. motors, all-electric adjustable-speed drives, gearmotors, and related electrical equipment in which the Reliance organization specializes.

★ ★ ★

Reliance sales engineers headquartered at the company's new Newark office are **F. Raymond Obenchain** and **John H. Stevens.** Telephone number, MArket 2-6176, remains unchanged.

EW **HIGH PRODUCTION METAL LOOMS**

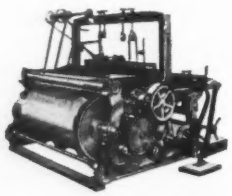
S.A.M.P.

Type BM for mosquito & fly nets, paste factories, armour plate glass, corn sieves, etc.

Type XL for flour mills, chemical and industrial works, etc.

Type CP for "Rabitz" cloth, plastering work, armour plate glass, etc.

Type CM for extra strong metal cloth for sieves, grain, rice, armour plate glass.



Jarach-Guetta, Industrial Overseas Co., Inc.

120 Wall Street, New York 5, N. Y.

General Agents of EMILIO WARTENWEILER,
Via Pergolesi 18, MILAN (Italy)

Looking Ahead Into the Coming Year

(*Continued from page 64*)

cations for aluminum wire exist. Non-toxic mesh filters of aluminum are widely used in the food industry. The gift novelty field alone produces many important uses for such varied products as figurines, toys, and stirring rods.

★ ★ ★

As noted above, 1953 should be a year of growth for the aluminum wire field. Subject only to external controls, wider use for both present and new applications should result.

---

by R. S. Lynch, President
Atlantic Steel Company

We have always looked to the coming year as a challenge, and 1953 will be no exception.

★ ★ ★

Located as we are, in the heart of the nation's most rapidly expanding industrial area, our future prospects look excellent. Although we may expect some softening in the market for certain consumer products, due to the restrictions of government controls, this should be offset by an increased demand for manufacturer's products.

★ ★ ★

The movement of wire consuming plants into our trade area, and the establishment of other new industries in the South, indicate that the demand for wire and other steel products will be greater than ever before. The diversification of industry, and the better balance between industry and agriculture, foretell a new era in the South's economic life.

★ ★ ★

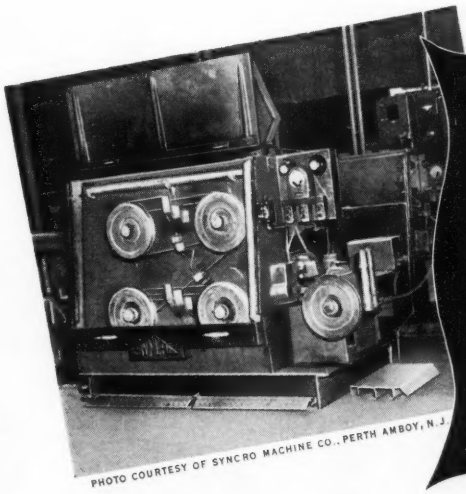
Our wire processing and fabricating departments have been completely modernized within the past few years. An insufficient steel supply has prevented us from operating these departments to their full capacities; however, sales have held our production to the highest possible rate.

★ ★ ★

Installation of a 60-ton electric furnace in May, 1952, has increased our ingot capacity by 50 per cent. This should enable us to furnish an adequate supply of rods to our wire departments, thereby utilizing their full capacity. We believe that customer's demands will permit us to operate these mills at a reasonably high production rate during 1953.

by K. R. Beardslee, General Manager
Carboloy Department of
General Electric Co.

From the standpoint of the wire die producer, the 1953 outlook appears favorable. Last year at this time, we faced government allocations in tungsten which threatened to seriously hamper our carbide wire die production. However, that situation has changed and we are now in a position to produce wire dies as demand dictates. In fact,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NOPCO's
DURPON*
Drawing Compounds
give
TWICE THE SERVICE
you can expect from
conventional compounds

Nopco's DURPON drawing compounds—specifically developed for wet drawing of nonferrous wire, rods and tubes—are all on the alkaline side, to assure optimum die life, and are natural lubricants.

But the special advantage these improved compounds offer is *emulsion stability*. For incorporated into each Durpon product is a stabilizing additive which prevents breakdown of the effective drawing ingredients when the bath becomes contaminated by dirt, small amounts of carry-over acid and metallic particles.

Because Durpon additives help maintain normal balance between soap and lubricant, the stability of the drawing emulsion during recirculation is increased and the useful life of the emulsion lengthened.

As a matter of fact, Nopco® Durpon compounds not only provide optimum lubrication, but retain their initial degree of performance for *twice as long* as conventional compounds.

If you draw nonferrous materials, Durpon compounds will assure you *better drawing results* and *reduced drawing costs.*

Immediately available are:

DURPON
for intermediate gauge wire

DURPON L
for heavy wire, rods, and tubes

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for fine wire

Fill out and mail the coupon. We'll send you a technical bulletin and trial-size order promptly.

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Gentlemen: Please send me a copy of your Bulletin giving information about Nopco DURPON Drawing Compounds.
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Company.....
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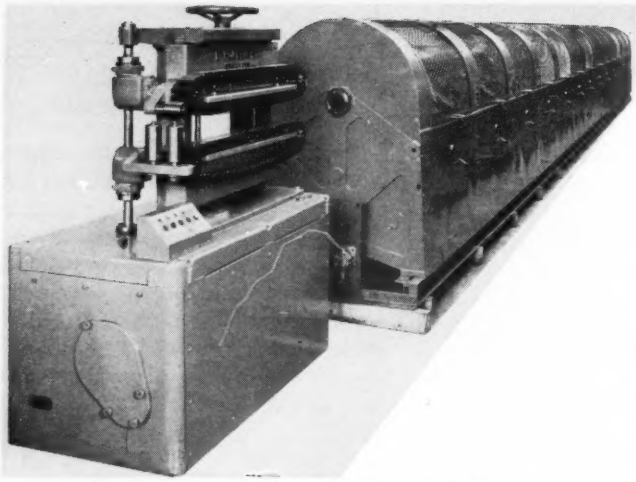

- Constant paper tension easy to predetermine.
- Haul-off by our caterpillar, Maillefer patented.
- Lockheed braked.
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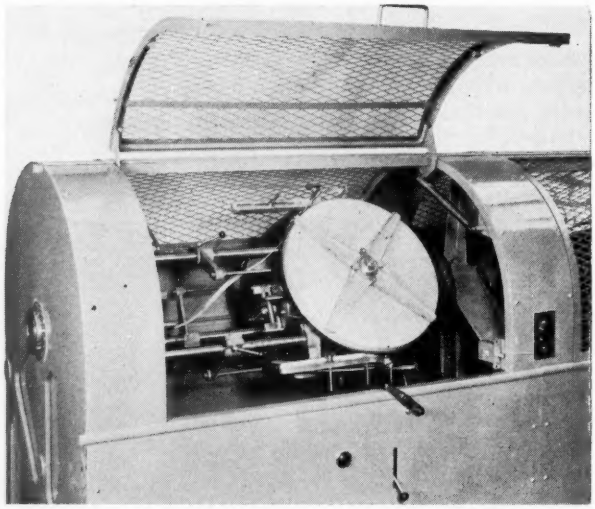
HERE IS OUR No. 8 MACHINE:

- 3" and 4" bore.
- 20" paper cheese diameter.
- 400 RPM.
- Stop motion.



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Wire Netting Machines for Chain Link, Hexagonal Mesh, Poultry Netting, Field Fence. Crimping, Barb Wire and Staple Machines. Spring Coilers. Spring End Grinding Automatics. Loop Benders. Upholstery Spring and Wire Mattress Machines. Wire Nail Machinery. Chain Formers. Chain Welders. Straightening and Cutting Machines. Multi-Slide Wire and Strip Forming Machines. Special Machinery for the making of Paper Clips, Lock Washers, Bale Ties, Key Rings, Tin Openers, Wire Bag Ties, etc. Automatics for Flexible Metallic Tubing.

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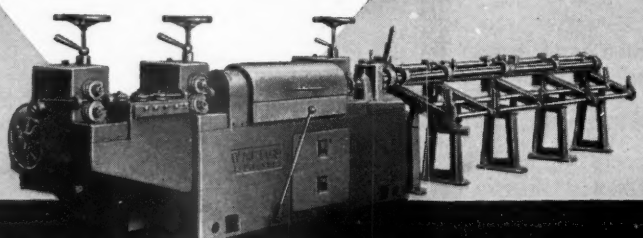


MASCHINENFABRIK WAFIOS

WAGNER, FICKER & SCHMID **REUTLINGEN 3 / WURTT. GERMANY**

our main plant and districts are now stocked to meet current requirements for all dies.

★ ★ ★

However, we do look to 1953 as a year when the wire die industry will give greater recognition to the value of utilizing carbides in wear-proofing critical parts. Among the examples which could be listed as ideal spots to use carbides are capstan rings, twister guides, feed fingers, guides on wire rope machines, cut off quills, and staple machine cutters.

---

by Benjamin F. Fairless,
Chairman of the Board
United States Steel Corporation

The American steel industry has now largely solved the problem of meeting steel requirements for defense and civilian use. United States Steel is justifiably proud that it produced nearly 29,400,000 net tons of steel ingots in 1952 despite the crippling effects of the 54-day strike at midyear.

★ ★ ★

Recent months have shown new postwar records in steel production, in all industrial production, and in personal income. Steel demand has remained strong and some steel products are still in short supply. Weakness in the first quarter is not expected. Consumer's stocks of steel appear generally to be below normal and unbalanced, but should return to normal levels some time in the second quarter of 1953.

★ ★ ★

In the second half of 1953, steel industry capacity—which will be in excess of 116 million ingot tons—should be fully adequate to meet the needs of defense and civilian users. This balancing of supply and demand does not indicate that we are entering a period of recession. Instead, I believe we shall then be engaged in a normal and healthy state of competitive selling.

★ ★ ★

Government regulations over the production and distribution of steel were in effect during the past year. The steel industry has expressed its conviction that these rigid controls are no longer needed and it has formally suggested a plan for decontrol to the National Production Authority. There is hope that elimination of current controls will proceed promptly in an orderly manner.

★ ★ ★

In spite of the 54-day strike and earlier work stoppages which caused a loss of about 7,000,000 tons from our mills, production in 1952 appears to have been the sixth highest in the history of United States Steel. Largely as a result of the increase in the company's productive capacity over previous periods, our production was only 4,900,000 less than the all-time record set in 1951.

★ ★ ★

On November 26, 1952, U. S. Steel poured the billionth ton of steel made in its furnaces since the company came into existence in 1901. This notable production achievement has special signifi-

---

WIRE SPOOLS, ALL-STEEL, LITHOGRAPHED

Ends and traverses may be shipped separaetly and assembled easily in your plant on a hand, foot, or power press.
5" and 6½" diameter ends with 1-15/16" diameter traverses.
10½" diameter ends with 3½" diameter traverses.
Traverse lengths up to 12".

J. L. CLARK MANUFACTURING CO.
600 23rd AVENUE • ROCKFORD, ILLINOIS

cance when it is realized that U. S. Steel alone during its 52 years has produced over twice as much steel as Russia in all her steel making history going back to the 1860's.

★ ★ ★

Our productive performance in 1952 was creditable in the face of obstacles other than the prolonged steel strike.

★ ★ ★

A severe shortage of scrap which threatened steel making operations during the year was averted by the organized effort of the steel industry in cooperation with steel consuming industries. This cooperative effort facilitated the flow of additional scrap and operations proceeded without serious disruption due to insufficient scrap.

★ ★ ★

The production job in 1952 was also creditable in view of the waste and confusion resulting from intermittent work stoppages caused by government's interventions in the wage negotiations with the United Steelworkers of America. This experience brought hardships to all parties concerned. The time has come when it behooves all of us to search for a better way to settle our labor disputes.

★ ★ ★

Looking to the future, our program for increasing steel capacity and our raw material resources moved ahead with significant strides. Among other projects, the American Steel and Wire Division is completing the engineering phases of plans to construct a blast furnace at Central Furnaces, Cleveland, Ohio, to expand capacity for commercial pig iron. Initial operation is now scheduled for the 2nd quarter of 1954.

★ ★ ★

In the period ahead I am confident that we are once again turning to the successful operation of the American free enterprise system. And in this atmosphere I am confident of the steel industry's future.

★ ★ ★

Cleveland Wirecapades

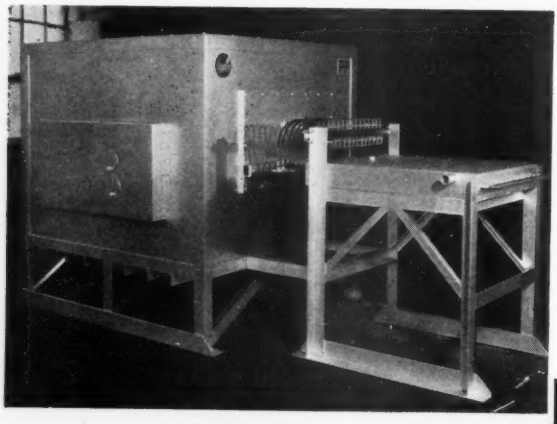
(*Continued from page* 63)

more than enough. A slightly cracking voice, somewhat of a tired, haggard look around the eyes, even an aching back—these then are the certain symptoms that a real job has been well done. Add to this the ability to attend every technical session, the luncheon, the smoker, and the plant trips, and there you have it! If any one member of our group can make this boast, let him proudly step forward for the coveted Medal of Honor. He has certainly earned it!

★ ★ ★

As per usual while the men enjoyed the Stag Smoker, Mrs. Chuck Orr and Mrs. Walt Smigel entertained some 45 to 50 wives at a fine dinner party at near-by Monaco's Restaurant in Cleveland. This was quite successful as was another "hen party" for the wives at the Cleveland Athletic Club Tuesday noon, compliments of the American Steel & Wire Company. Special credit is due one of the fine hostesses, Mrs. Ray Snow. The ladies were even taken on a plant trip, believe it or not. The trip,

FOR
DEPENDABLE EFFICIENT LOW COST SERVICE
SELECT HARPER PRODUCTION FURNACES
for
***your* HEAT TREATING OPERATIONS**



Harper 30 strand Electric Wire Annealing Furnace, designed for bright annealing stainless steel wire in a hydrogen atmosphere. Temperature range is 2000°F - 2200°F. Uniform results easily obtained by maintaining extreme temperature uniformity during slow anneal in accurately controlled atmosphere. Sizes to meet production requirements for wire and strip annealing.

TYPES

Mesh Belt — Pusher Type
Bell — Elevator
Pit — Car Bottom
Box — Forging
Wire and Strip

PROCESSES

Continuous Brazing — Sintering
Bright Annealing Stainless Wire
High Speed Steel Heat Treating
Billet & Bar Heating — Annealing
Melting in Crucibles — Forging
General Heat Treating

WRITE FOR BULLETIN 1051

HARPER ELECTRIC FURNACE CORPORATION
Dept. 12, 39 River Street, Buffalo 2, New York

Harper

however, had nothing to do with the steel industry.

★ ★ ★

Names obviously make the news. One certainly cannot list all 622 in attendance plus the many wives on hand, but here follows a few odds and ends which may be of interest: From Apex Alkali Company of Philadelphia the Richards Brothers, Big Jack and Little Slip, along with Bill Bauzenberger, Bob Morton, and many others. When Jack checked into his suite at the hotel, much to his surprise and distress there were two colored hotel porters sound asleep on the bed and enjoying the full luxury of the Simmons mattress. A hasty check-up with the hotel management revealed that not only were they in the wrong room, but were stealing a little shut-eye on company time. When last seen, they were racing down the halls half awake stumbling toward the service door.

★ ★ ★

No wire convention is ever complete without that congenial chap from Homer, New York, Van Miller. Also present and accounted for to help out Van, we saw Walt Smigel, Jeff Crum, Grey Verner, Al LeBlanc, and Bill Breidinger. Kitty Crum and Betty Smigel ever present to greet their many friends. In from Fostoria, Ohio, was newly appointed Vice President of Seneca Wire, Charlie Turk. From Atlanta, Georgia, as mentioned before, Clem McGowan and his charming wife. Known to all of us as Aunt Kate, she certainly understands as much about wire conventions as anyone, I honestly believe. Also from the deep South, Atlantic Steel's Walter Patterson. There were many in from the Vaughn Company. To name a few, of course President Lee Vaughn, E. J. McIlvried, Pat Weisel, Gene Daugherty, and brothers Jim and Gordy Vaughn.

★ ★ ★

From across the wide Atlantic, England's competent industrialists, Cyril Frederick Baggs and Phil Thirkell Cox. There's something about their English jokes, complete with varied accents, that made very interesting commentary one evening in our room. These two had about a dozen of us including

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Underwriters' approved standard compounds are available in all colors for POT, T, TW, 80 Degree C, 90 Degree C and 105 Degree C wires.

Save your plant space for wire processing equipment. Let us tailor your compounds to bring out the special properties you require.

Your inquiries are invited.

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IF YOU REQUIRE

NO CMP REQUIRED

Submit your
SPECIFICATIONS
To The
REPRESENTATIVES:

J. GERBER & CO., INC.
855 Avenue of Americas
NEW YORK 1, N. Y.

Mr. and Mrs. Crewe, Mr. and Mrs. Hitchcock from Branford, Connecticut, my wife Tish and myself really rolling in the aisles. I think what pleased Phil Cox more than anything on his first trip to America was the fact that we Yanks generally caught on and enjoyed greatly his every story.

★ ★ ★

Obviously no convention would run or even get in motion without the capable management of Major Dick Brown and Mrs. Ruth Spengel. These two, aided and abetted by Ed Sickels and Ed Donnellan, labored many long months before all plans and arrangements were properly shaped up. Orchids to them for their tireless efforts.

★ ★ ★

More personalities in the news. In the El Rancho room many of our good friends from Standard Industrial Compounds held forth to the delight of all. To name just a few, Mr. and Mrs. Chuck Orr, Mr. and Mrs. Floyd Hauger, Mr. and Mrs. Earl Bowers, Mr. and Mrs. John Moritz, Jr., and others. John's brother-in-law and wife in from Jacksonville, Florida, Mr. and Mrs. Larry Whitmarsh. From Bethlehem Steel's Johnstown plant we saw John Seibert, Bob Stebbins, John Kane, and others. Annual conventioneers Mr. and Mrs. Bruce Siemon in from Pittsburgh. Some of my good friends from Ambler, Pennsylvania, Jim Abrams, Dick Bailey, A. E. Beighley, and other salesmen from American Chemical Paint Company. Noticed Mr. and Mrs. Bill Bawden on hand, shopping furiously the last day of the convention for that kid's present. Among the many spool salesmen with their wives were Mr. and Mrs. Bill Braster. From Massillon, Ohio, Bucky Buchanan and his capable new helper, Tom Girdler, Jr. Tom's chest was particularly s w e l l e d when he told us about his new grandson.

★ ★ ★

Former school associate from Pittsburgh, John Corson, now metallurgist for Carpenter Steel Company. Ed Vereeke and Ken Grader from the Heil Process Equipment Corporation. Earl Glen, one of

BORAX

COATS STEEL RODS WITH JUST

ONE DIP!

Check The Advantages Borax Offers:

✓ **BETTER WORKING CONDITIONS**
Borax is clean, dust-free, nonflaking

✓ **FASTER BUTT WELDING**
Borax is a natural flux—butts are ready

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Borax is protection against rust

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Borax film is tight, pliable, nonflaking

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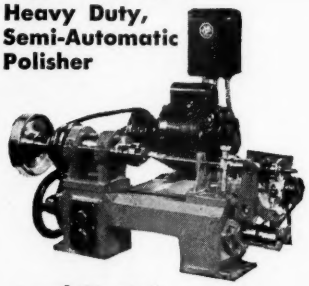
Combined Finishing and Polishing Machine for Tungsten Carbide Dies

Model "M" as a Heavy Duty, Semi-Automatic Polisher



—and Presto!
It's a Hand Finishing Machine!

- No parts are removed from machine
- Fully automatic—just plug it in
- No lost time or motion in changing
- Ball bearing head stock
- From automatic to semi-automatic to hand finishing without changing the die or stopping the motor
- It's a labor saver!

It's New! It's Different!

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"IT CORRECTS THE DIE"

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DYKREX CORPORATION OF AMERICA
33-35 Bloomfield Ave., Newark 4, N.J.

America's great die peddlers, and a large group in from Carboloy, Detroit. Curt Voigtlander and Stewart Gray present and accounted for from Union Wire Rope.

★ ★ ★

As usual, the Haarbauers combine the wire convention with a family reunion. Henry in from the Townsend Company at New Brighton, Pa., was joined by son and daughter-in-law, Mr. and Mrs. Bill Haarbauer from Dixon, Illinois. Also son George from Plymouth, Michigan, and last but not least Don Haarbauer, wife and family, all the way up from the deep South, Fairfield, Alabama. Don still enjoys the rod and wire meetings although he has long since transferred to another branch of the steel industry. Father and son combination from Rock Falls, Illinois, Bill Hill, Jr., and his dad. Youngstown Sheet & Tube Company's Floyd Hoskinson, Joe Williams, and many others. Pittsburgh Steel, with Mr. and Mrs. Chuck Williams and Mil Jenion, were well-represented.

★ ★ ★

The pride and joy of Donora, Pa., Joe Just and Ken Brant were also in attendance. I had a nice chat one day in the lobby with Dutch Kohler from Crucible Steel Company, Midland, Pa. Sparrows Point representation included Mr. and Mrs. Carl Johnson, Jere Heisler (who presented a fine paper at one of the technical sessions) and Pete Raffensperger. Roebling, New Jersey, was accounted for, to name a few, by Jack Smith, Hank Godfrey, and Mr. and Mrs. Rudy Hertzog. Tommy Spillett from Crucible Steel Company, Syracuse, New York, was quite a benefit for all concerned at the W. B. & N. gathering. Bill Waters from the Steel Company of Canada in Hamilton can verify what we say about Tommy's particular abilities.

★ ★ ★

I enjoyed trading stories with Syl Splain and Lou Shulver one afternoon in the lobby, as well as good friend Harry Peterson and Al Brown from the Crown Chemical Company in Indianapolis. Bill

Just Common Sense . . .

It's just common sense for wire manufacturers to prefer non-returnable spools that meet specifications—and also cost less. That's why more Mason Spools are being used in the wire industry than ever before!

See for yourself how Mason Spools can help save you money. You'll find them available in standard head and barrel sizes.

Write today for samples and a quotation based on your requirements!

MASON CAN COMPANY
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MASON CAN COMPANY OF OHIO
Greenville, Ohio

THE LACQUER INSIDE MAKES THE DIFFERENCE

Most drums of lacquer look pretty much alike — from the *outside!*

But the lacquer inside can vary a great deal in its ability to meet your cable coating requirements. Only a lacquer that is expertly formulated with your own end use in mind can give *completely* satisfactory performance.

When you specify *New England* lacquer, you can be sure that each drum contains the *right* cable coating for your requirements. That's because it has been formulated specifically for you by experienced insulated wire specialists.

The above photograph is one of many contained in an eight-page brochure describing our facilities to serve you. Write for your copy of the complete brochure!

NEW ENGLAND LACQUER CO.
150 KING PHILIP ROAD
EAST PROVIDENCE, R. I.

Parkin in from the Parkin Chemical Company was also seen. Irish Frank Leahey, all the way from Davenport, Iowa, is fast developing the habit of coming to the conventions Wednesday and getting out in a hurry. It was good to see once again Floyd Hauger's right-hand man, A. A. Weigel. No meeting is ever complete without Sandy Sanderson, Rod Tatnell, Will Campbell, Hank Passolt, and Joe Carter, Jr. We returned on the train from Cleveland to Pittsburgh with Dan Neuman from Monessen and Mr. and Mrs. Bill Hitchcock, so I know they were there. Also included in the group, Les Sommer and his lovely wife from Crawfordsville, Indiana. Following the wire convention it was recommended that several of the members headed up by Mr. Charles Turk return to Fostoria for a shoot; it was either peasants or pheasants, I'm not sure which.

★ ★ ★

Among the capable directors of the Wire Association on hand were Bob Peterson, Ralph Roth, J. R. Thompson, Bill Wells, Sidney Rolle, and of course Dick Brown. President of the Continental Steel Corporation of Kokomo, Ralph Clifford was seen, as well as a brother president Fred Crapo from Muncie's Indiana Steel and Wire Company.

★ ★ ★

Various individuals aided considerably in the technical sessions. To name a few, Uno Johnson from Detroit Steel at Portsmouth, Ohio; Joe Carter, Jr., from Worcester, Mass.; Jim Flood from Jewett City, Conn.; Bill Wells from Waterbury; and D. M. Schmid from Prospect Park, Pa. Others included Walter B. McShane, U. S. Steel; Les Whitney from Glassport, Pa.; Howard Allen from Holyoke, Mass.; Bill Crater from Naugatuck, Conn.; C. E. Jackson, Essex Wire, Marion, Indiana; and many others.

★ ★ ★

We were greatly honored at the Mordica Memorial luncheon to have Harvey B. Jordan, President of the American Steel & Wire Division of United States Steel Company on hand. Mr. Jordan was recently appointed exec. V. P. operations U. S. Steel. Our good friends in

H-D

BUNCHING
(TWISTING)
AND
STRANDING
IN THE WIRE AND
GENERAL MANUFACTURING
PROCESSES

SPECIALIZED
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Expanding application of twisting principles to the production of many products is reflected by an ever-increasing demand for both H-D standard equipment as well as machines especially engineered to solve varied production problems. Week after week surprising new uses are developed through the close cooperation of our engineering department with manufacturers in many fields.

Write today for our New Technical Bulletins. Tell us what you make—or contemplate making and your inquiry will receive prompt attention.

HASKELL-DAWES
MACHINE CO., INC.
2231 E. ONTARIO ST.
PHILADELPHIA 34
PA.

from your own company in Newark, New Jersey, included Ben Mundi and "young" Peter.

★ ★ ★

Well, Mr. Peter Igoe, here's hoping your health is improving. Certainly sorry you were unable to attend our Cleveland gathering, but may we see you in Chicago next year.

★ ★ ★

Certainly no one person could begin to cover a gathering of this type in the guise of a reporter. These are only a few of the highlights of our week in Cleveland. Had I remained up for five days and five nights and attempted to cover every suite in the hotel, I would still be quite incomplete in my reporting. It just couldn't be done.

★ ★ ★

Conventions, as pleasant as they are, are somewhat wearing, don't you think? It's always good ultimately to shake hands, say fare thee well, and head for home. You have learned a little something businesswise, you have seen many old friends and acquired lots of new ones, you have perhaps picked up some new ideas and discarded old ones. After all, isn't this the end goal for all of us? Somewhere buried in the by-laws of the Wire Association is outlined our purpose: "Its specific purpose is to improve production methods, afford a clearing house for ideas on management problems, technical problems, research work in all phases of practical wire drawing and wire working and to develop and maintain friendly relations among the members." You can safely say that at the Cleveland Convention of 1952 this purpose was very completely and fully achieved.

★ ★ ★

Next year, be the Good Lord willing, we gather once again in the La Salle Hotel in Chicago. There will be a few familiar faces missing, certainly there will be many new ones. But then, that is what keeps the world going.

★ ★ ★

Best wishes to you and all your friends in the industry, and incidentally a very Happy New Year!

We appreciate the interest

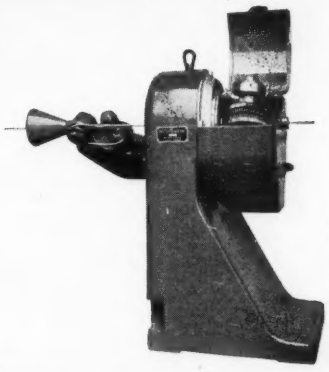
of 300 WIRE MEN

who inspected the

NO. 1 LINÉ-GORCY

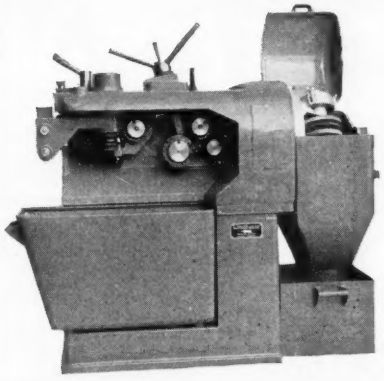
MECHANICAL

WIRE ROD DESCALER



—which we exhibited during the

1952 WIRE CONVENTION



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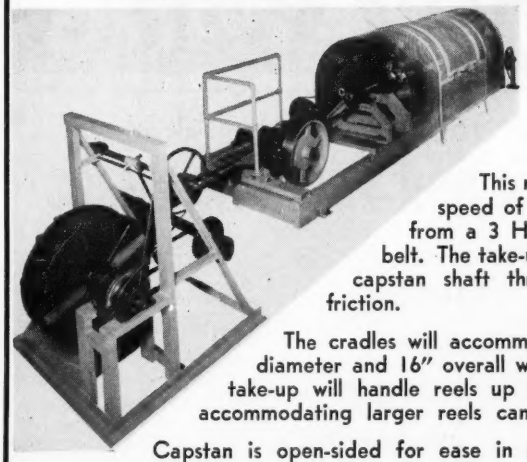
TWO-WIRE TWISTING MACHINE



with

LET-OFF,

MOTOR DRIVE

and TAKE-UP

This machine is built to run at a speed of 1140 R.P.M. The drive is from a 3 H.P. Motor, through a Vee belt. The take-up is chain-driven from the capstan shaft through an adjustable slip friction.

The cradles will accommodate reels up to 30" in diameter and 16" overall width, while the let-off and take-up will handle reels up to 30" by 16". Take-ups accommodating larger reels can be supplied if needed.

Capstan is open-sided for ease in operation.

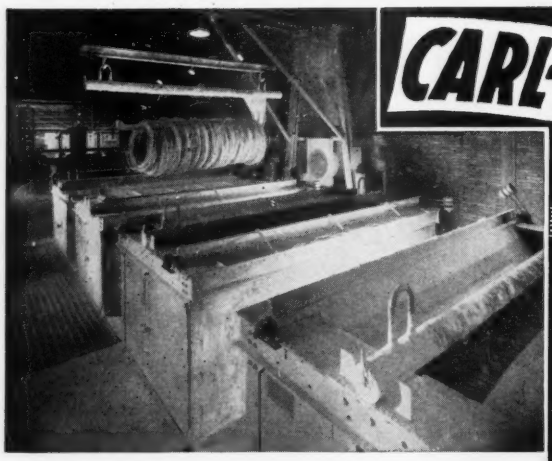
Change gears are standard Boston Change Gears. The Machine will twist a wide variety of wires with lays varying from 1/2" to 6".

Overall dimensions of let-off, twister and take-up, set up for operation are 22 feet long by four feet wide. Weight of complete unit is 2300 pounds.

Write for further details of our efficient 2, 3 and 4-wire twisting machines.

THE EDMANDS COMPANY

228 Aborn Street • Providence 3, R. I.



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HI-SPEED REGISTERED

ROD BAKERS

PATENT Nos.
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2,296,361
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396,144
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ALSO OTHER TYPES OF INDUSTRIAL OVENS AND FURNACES

GREATER SPEED AND FUEL ECONOMY PROVES OUTSTANDING ENGINEERING

Carl-Mayer Hi-Speed Rod Bakers have an exclusive heating arrangement, combining faster baking with amazing fuel economy—and a patented Blow-Off feature which removes moisture without bumping or agitating the coils. *WRITE FOR BULLETIN NO. 350.*

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THE CARL-MAYER CORPORATION

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FROM .0403" TO .005" (Not Annealed)

FERROUS and NON-FERROUS WIRES

SPECIALISTS IN:

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OUT WITH CONFIDENCE ANCHOR QUALITY

ANCHOR WIRE CORPORATION
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Joins Hooker to Head Research

J. H. Bruun has joined **Hooker Electrochemical Company,** Niagara Falls, N. Y., as director of research. Dr. Bruun will have charge of basic research, pilot plant development and product application. Hooker is planning much broader research activities in the period immediately ahead. This program includes the construction of new centralized research laboratories.

Another Avenue to Productivity

(*Continued from page* 36)

Your question reminds me of the observation one of our executives made the other day.

★ ★ ★

Himself a lawyer, he said he likes to remember his earlier days when he lived in a small town where there was only one lawyer. It seemed that everybody in town took their legal problems to this gentleman, and after considering the law, he usually would suggest equitable settlements which were generally accepted. And, thus life went on merrily until one day another lawyer moved into town. Then it seemed as though everybody's grievance had great merit, and everybody wound up going to court.

★ ★ ★

Now, American industry has gone through a long period of great expansion.

★ ★ ★

The little shop, where the owner knew all of his employees and they, in turn, knew him, has expanded and expanded until today vast industries are all about us.

★ ★ ★

In this course of growing into large organizations, it was necessary to devise a system of management which decentralized responsibilities and authority. In the course of these events it developed that the employees and the policy-making top levels of management were—to a degree—insulated from each other.

★ ★ ★

This process of development of a management organization has been

going on for scores of years, and great advancement has been made —and still is being made—as is witnessed by the findings of our overseas friends.

★ ★ ★

However, it has been demonstrated time and again that there is a need for a warmer and closer meeting of the mind at the point of contact between the worker and management. And, of course, this means at the first line of supervision—the foreman or his equivalent in the other departments of the organization.

★ ★ ★

This is, perhaps, very fortunate. In this first-line-of-management-area lies today's counterpart of the small shop of yesterday.

★ ★ ★

Why not conduct human relations in this area on the small shop basis? Sure, we have new regulations and directives and curbs at every turn. But, let's turn our efforts to modeling our factory departments after "little towns with one lawyer."

★ ★ ★

Let both management and labor recognize this host of legalistic and contractual wordage as a guide to workable solutions. Let us not be quick to holler "Copper" and grab up the law books and make a court case out of every incident. Let both labor and management pride themselves on the number of grievances they can satisfactorily prevent.

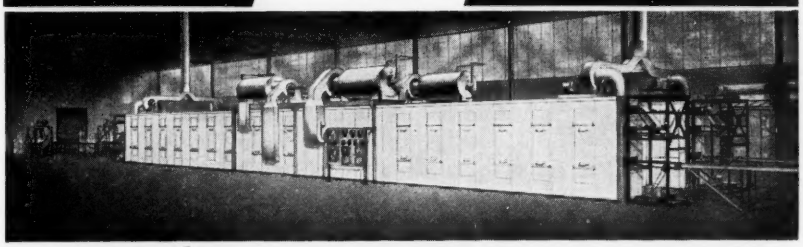
★ ★ ★

Let me refer to Mr. Fairless on this point. Having been involved in one of the severest labor-management go-rounds of our times, I am certain his observations reflect authority and timeliness. I quote him in a recent address:

"I believe that this nation has a right to expect American labor and management to bargain in a spirit of reason and decency. I believe it is fed up to the gills with name-calling, mud-slinging and personal abuse. I believe it expects labor to use the strike only as a weapon of last resort—not as the opening gun in a campaign for tactical advantage. I believe it expects management to respect and defend the right of its workers to bargain, voluntarily,

CARL-MAYER WELDING ROD OVENS

PATENT NOS. 1,843,430 2,373,325



One of Several Carl-Mayer Ovens at Hollup Corp.

FAST, EFFICIENT AND ECONOMICAL DRYING OF COATED WELDING RODS.

Only in Carl-Mayer Ovens can you obtain the combination of the recirculating gas fired air heater principle and the "Mayer" patented rod transfer system — two highly important features in ovens of this type.

We also build other types of industrial ovens and furnaces. Carl-Mayer installations are backed by reputation for unusual performance, and over 30 years' experience.

WRITE FOR BULLETIN NO. 350

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NORBIDE® Abrasive: *Effective, Economical*

NORBIDE Abrasive, made of Norton Boron Carbide, is second only to the diamond in hardness — *but 150 times less expensive!* It will effectively cut and semi-finish wire drawing dies, particularly those made of the hard cemented carbides.

Write for Catalog No. 559-W

NORTON COMPANY
Worcester 6, Mass.

NORTON *Making better products to make other products better*

Calendar of Coming Meetings of
THE WIRE ASSOCIATION

April 16-17: Regional Meeting in Trenton, N. J., at the Stacy-Trent Hotel.

May 7-8: Regional Meeting in Montreal, Can., at the Mount Royal Hotel.

June (date to be set): Regional Meeting in San Francisco, Cal. — Sir Francis Drake Hotel.

Sept. (date to be set): Non-Ferrous Meeting in Waterbury, Conn., at the Elton Hotel.

Nov. 9-12: Annual Convention in Chicago, Ill., at the La Salle Hotel.

Programs will be published in Wire & Wire Products

THE WIRE ASSOCIATION

453 MAIN STREET **STAMFORD, CONN.**

ROCKWELL FURNACES

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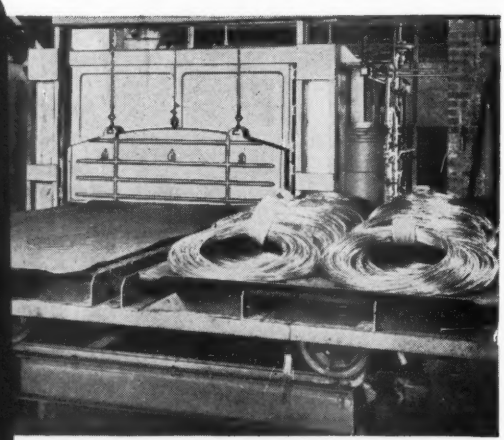
Batch or Continuous · Oil, Gas or Electric

Direct Heated Muffle Type Radiant Tube Atmospheres



Gas-fired pan type furnace for annealing 5000 lbs. of medium gauge brass wire; furnace atmosphere controlled to produce oxide-free wire — in many cases practically bright. Other Rockwell furnace types include parallel tube, belt conveyor, pit, hood and others.

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FURNACES · OVENS · SPECIAL MACHINERY

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through unions of their choosing. I believe it expects both of us to live and to let live—to recognize that our long-range interest are identical . . . . not antagonistic . . . . and that anything which injures one of us will gravely jeopardize the security of the other."

Mr. Fairless continues:

"In short it expects us to substitute cooperation for conflict; and to end this industrial warfare once and for all.

"That is a large order. It is a task to challenge the finest minds in the land. It will demand infinite patience and endless perseverance. But if it can be accomplished, it will stand out—I think—as the greatest contribution of this century towards the industrial development of America . . ."

★ ★ ★

We in management can do our part to bring about industrial peace by setting a pattern which our first line of management can follow—a pattern which can be applied by union officials as well as by ourselves.

★ ★ ★

In advocating this point, let me re-emphasize I am not suggesting that management adopt the philosophy of appeasement; for nothing could be more harmful to real long-range productivity. I have in mind a two-way street for both labor and management to travel toward a goal of common understanding—the kind of understanding and acceptance that creates an atmosphere where the will to produce prospers.

★ ★ ★

Now, in discussing a pattern for our first line of management to follow, please do not misunderstand me. I am not in any way trying to spotlight our first line of management with the responsibility for the labor-management difficulties we may have had in the past.

★ ★ ★

Those people have done a magnificent job of keeping our industrial boat on an even keel in the stormy seas that have been created through the growth of industrial companies, spiraling technological change, and the vagaries of a labor movement growing into adulthood.

★ ★ ★

There have been mistakes made at the plant level, to be sure. But often they have been merely reflections of top management's failings

—failings either to develop a concept of genuinely human relations, or to make known that such a concept or policy exists.

★ ★ ★

We are all familiar with blueprints. The simplest type of building or piece of equipment requires a blueprint if the person who performs the job is to turn out a finished product exactly meeting specifications.

★ ★ ★

You and I can turn out a simple foot stool without a blueprint because we have in our mind what we want. If, however, we expect someone else to build that foot stool exactly as we want it, we must provide him with a sketch, showing dimensions, general outline and type of material to be used.

★ ★ ★

If we are trying, in our jobs as managers, to create a much more complicated structure called an efficient business organization, doesn't it naturally follow that a blueprint or at least a pattern be provided for those individuals who actually are going to do the work?

★ ★ ★

Yes, we must not only establish a pattern — a humanitarian approach to labor relationships—we must also make the details of that pattern clear to the men we are entrusting with the construction of our organization.

★ ★ ★

If our friends from across the sea are correct in their flattering appraisal of American management's attitudes, we can certainly feel that we are on the right road. But, let us be vigilant that we are not deterred.

★ ★ ★

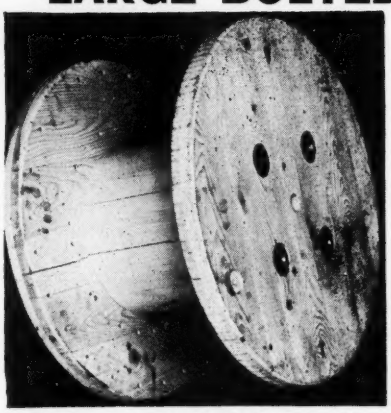
And, let us make sure that everyone involved is aware of our destination so that the road ahead, looking toward ultimate greater productivity, is kept clear of the pitfalls that develop when the minds of men fail to meet for want of the light of understanding.

LARGE BOLTED REELS for

WIRE ROPE

and

ELECTRIC CABLE



View of typical bolted reel.

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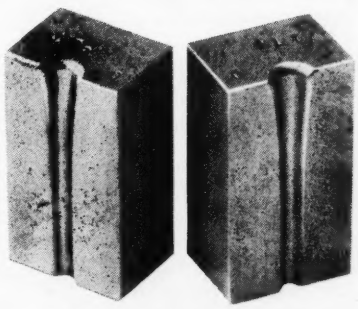

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Wire Association Proceedings

(*Continued from page* 59)

A Member: You spoke about strand annealing your wire. Do you find that preferable to batch annealing?

Mr. Schmid: On finished wire, yes. The strand annealing gives you a smoother surface, and for some particular customers you have to have a good wire. For those who make an extra good product and need to have a smooth surface, we strand anneal the wire.

A Member: But it might actually save space.

Mr. Schmid: It does. Those strand furnaces stretch out for seventy, eighty feet.

A Member: In your wire that has to be leaded, do you have to take the lead off before you anneal?

Mr. Schmid: That is very important. Lead would definitely promote intergranular attack, so you have to take it off.

A Member: I don't want to monopolize your time, but wouldn't your strand annealing make a nicer finish?

Mr. Schmid: Yes, sir. Sometimes you can't do that because you can't brighten it up. You can't do a very good pickling job. You can't spread the coil out enough. That is a slow, costly operation. The way somebody can make a fortune is to develop a good bright batch annealing.

A Member: I was wondering if anybody has given very much thought to the problem of final quality inspection from a handling standpoint, where you would have to make all your physical readings plus inspection plus handling, and so on, for any item that is inspected. In my case it happens to be radio tube and grid wires. I wonder if anybody analyzed it from the standpoint of industrial engineering that may be having one person doing the complete job, or breaking it down to three or four?

Mr. Schmd: You have a lot of schools of thought on that. The one man doing the operation has been followed in a lot of plants I know of, because they thought that every operation would be done, and there was some connection where actually motion study or motions could be eliminated.

Men have studied methods and procedures and some of them have come up with the conclusion that it was better to have one man do it, but at the same time whether they would have a volume on it like you would have; they also specialized and put one man on the tensile strength, elongation, testing; another man on size; another man on finish; and, perhaps, quality of spooling.

I have seen straight line benches where they were all set up with the work stations. Sometimes there the thing was breaking it up into an even enough work load so that each operator is kept busy. It is sometimes hard to do.

A Member: Your ASTM is making quite a drive on quality material.

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Mr. Schmid: We have a quality control system. That is something else we are going to improve. I say this, though. We will never be satisfied with it. It is something that will have to be improved constantly. We have studied statistical quality control where you can not inspect every part, but you get even more complete inspection for less money.

Often it costs more to inspect a wire than it does to make it. You draw the wire at two or three thousand feet a minute and you inspect it at two feet a minute. So the inspection costs more.

A couple of my associates are here from our place. I want to give them a lot of credit for these good ideas, plans and suggestions. Ralph Cooper has had a tough job during all this expansion period because he has had to keep getting out production, too. It wasn't an easy job. You have to concentrate this quality controller on that, so he deserves more credit than I do for these new plants, methods and procedures that you have seen here this morning.

Just like .002" diameter wire, I guess your cost is more on inspection than it is drawing; isn't it?

A Member: Yes; but you can cut it down if you put it on a forty-pound spool.

You asked me for a comment on the visibility of inspecting in a straight line production set-up. It is a wonderful idea. The only trouble is that many inspection operations on each piece of material, on each type of material, requires different inspection operations, so you end up with so many straight lines that you can't get them all in the available space.

The best answer is that a compromise is the best you can do.

Mr. Schmid: Well, I wholeheartedly agree with you on that, but I am sure he is working on something better, like we are.

If there are any more questions on Dave's paper, you could get together with him afterwards and I am sure he wants you to take a look at this scale model, and pick one of these books that he has. . . . Applause . . .

Our third paper this morning is going to be by Dr. Robert C. Williams. Dr. Williams graduated from Oberlin College with an A.B. and A.M., and went on to Stanford University where he picked up his Ph.D. He worked for Firestone for a while and then with the Battelle Memorial Institute.

Since 1932 he has been with the Ironsides Company, and at the present time is director of research.

Dr. Williams is going to talk this morning on "Control of Wet Wire Drawing Solutions for Copper."

. . . Applause . . .

. . . Dr. Williams presented his paper . . .

A Member: Dr. Williams, you mentioned in your settling tank that the hydrolysis of the fat causes fatty acid to increase quite a bit, thereby reducing the pH and eventual trouble starts in your subsequent operations when you put that operation of the material that has been settled into your main system. Don't you think that the bacteria or the emulsifier itself, the soap, has a lot to do with the subsequent build-up of fatty acid, and also has something to do with the subsequent decrease in surface tension of your following solutions, and,

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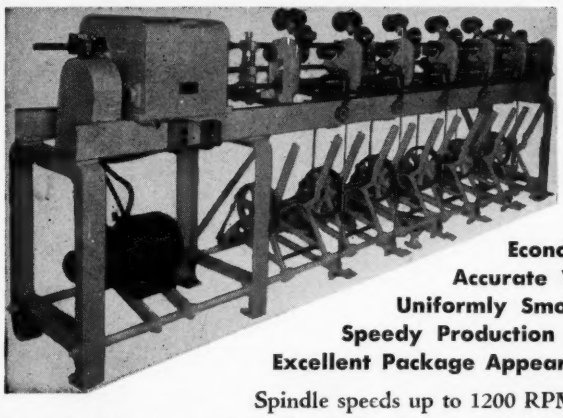

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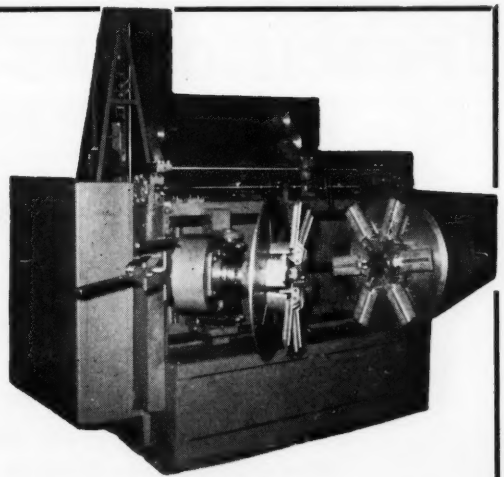

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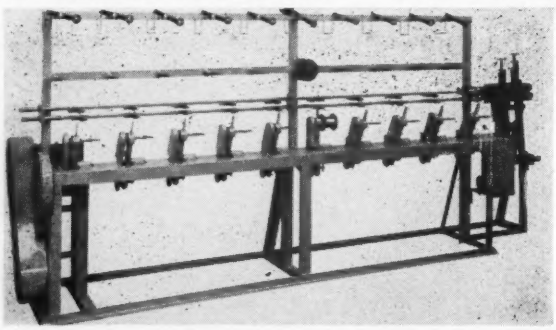

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as your soap content increases, your surface tension should decrease, and the balance between the fat and the soap, as I understand it, is the controlling feature of a good wire drawing solution or a true wire drawing solution, whatever it might be, it is the balance between the soap and the fat that is the important thing, and if your soap has a tendency to go out either in your settling tubes, which have bacteria, it will show up in the subsequent use of the solution.

What I was going to suggest was possibly aerating your settling tank by constant aeration or by use of a germicide, such as would control the action of the bacteria on the soap.

I ran some tests on it some time ago and I found that where you check for free fatty acid and check for soap, you find that the total will remain a constant both before and after settling, but I find the soap content has gone down if the fatty acid has gone up three per cent. I have usually found that the soap content has gone down by a proportionate amount.

I was just wondering if the control of the bacteria in your settling basin would be a very definite help.

Dr. Williams: I have never given that too much consideration. The bacterial angle I have looked into some years ago and we felt and believed from what we found that if you maintained a pretty decent pH, the bacteria angle was pretty well licked, but that may not be the answer.

Now, getting back to that soap balance, I think you have got a point there, but the total salts enter that picture as far as the surface tension is concerned. I am absolutely convinced of that. I can't help you out much on that bacteria angle.

Does anybody else have any experience in that direction?

A Member: Bob, has anybody done anything towards using silicones for producing foaming in compound batches?

Dr. Williams: Yes; we have tried some.

A Member: Does the damn stuff get on the wire so nothing will stick to it?

Dr. Williams: I have seen that happen on fine wire, but I think the silicone got on there and excluded the silicone, so to speak. It went into an epidemic of breaks.

A Member: There are stories of a liquid oil drip of some kind, putting a drop in every two or three minutes or that sort of thing.

Dr. Williams: I don't like that. That is too long in acting. I mean, if it licks your problem, it may lick it so badly that you don't get enough detergency to keep a wire machine clean.

A Member: I know you have got to sell the doggone stuff to stay in business, but in regard to your surface tension, is there any merit in probably adding a wetting agent instead of more compound?

Dr. Williams: We have been into that very extensively. I think there is. There is one place that you must be very careful. It is a little like that silicone thing. If you add a wetting agent that, let's say, has little or no lubricating property, and it is preferentially absorbed by the wire, you can bugger up your lubrication while you are reducing the surface tension.

A Member: What you are telling me is that it doesn't do the compound any good?

Dr. Williams: As a broad sweeping statement, that is right, but there are certain wetting agents that do not harm the compound at all. In other words, they aren't competing for a seat in the seating arrangement on a copper wire. In other words, the lubricant grabs hold of that wire instead of the wetting agent sufficiently so that a good lubricating job is done. There may be some wetting agent molecules on there, but the lubrication is still pretty good.

A Member: Has your experience indicated that where you have a settling tank of sufficient capacity, that you can take the solution outside to another storage tank for a short time to rip out the sludge in the bottom, does the removal of that sludge help your dynes per centimeter?

Dr. Williams: No, it is out of the scene of action, so to speak.

A Member: All right, then. How long can you keep taking this solution outside and taking it back and fortifying it? Is this measure of surface tension still adequate if you still keep bringing the solution back and fortifying it and continuing it use it?

Dr. Williams: Much to my disgust, some people do that more than I like to see. If you fortify it with enough fresh make-up—bear in mind when you take that sludge off the bottom—you don't know how deep it gets. Some places it occupies a pretty good percentage of that tank so that you have got to add enough new solution so that the part you are fortifying is sufficiently small in percentage so that you can keep on using for quite a while.

Did I make myself clear, without confusing that wetting angle?

A Member: We find that it is something of the order of twenty-five per cent, perhaps, of sludge volume.

Dr. Williams: Yes.

A Member: But we are using a lot of the old solution over and over again. I wonder when I will have to dump the seventy-five per cent and start the new batch.

Dr. Williams: How old is it?

A Member: Four or five years now.

Dr. Williams: If you add enough new solution, you will probably get by almost indefinitely. I couldn't tell you. I haven't followed enough case histories to know, but I think somebody ought to purge that system out.

A Member: They say that you should have some of that old stuff in there for a better solution.

Dr. Williams: Some say that you can't draw well unless you do have some of the old stuff in there. It is like making a stew in a restaurant, part of which has been in there twenty years. If they ever lost that basic potful of stew, they wouldn't think it possible to make good stew.

A Member: Do you recommend the use of a sequestering agent?

Dr. Williams: Well, the basis of that is that it regenerates soap. I have seen a foam generation that would scare you to death. I don't recommend it. I think they are a little too hazardous. If you use them at the start, in the

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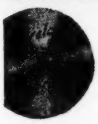

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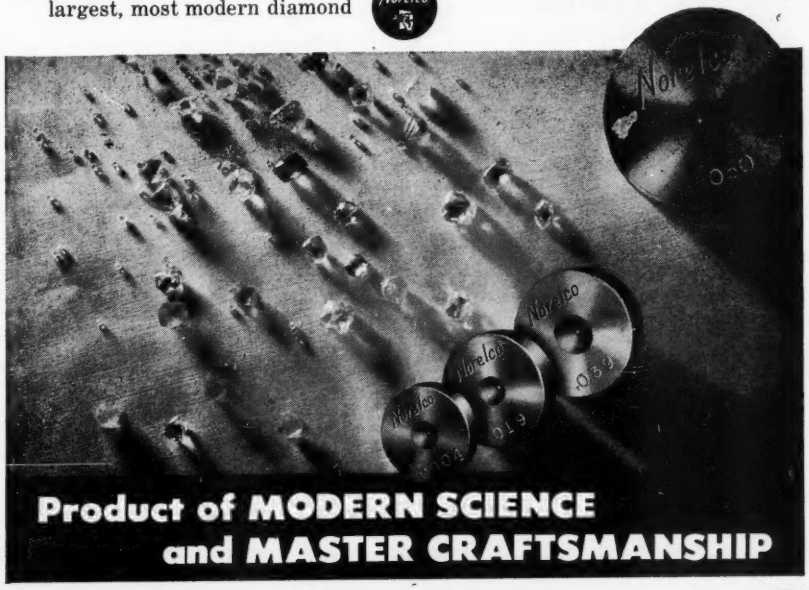

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make-up, you might do all right. I wouldn't say that it is too bad, but to begin to add a sequestering agent during an operation, that I consider bad.

A Member: You mentioned the drawing of acid pickled rods neutralizing some of the alkaline reserve of the soap.

In such a case, would you recommend the use of buffers to perhaps maintain a pH where the soap would work efficiently?

Dr. Williams: No, for this reason. A buffer has to be in there in reasonably high concentration to act as a buffer, and those buffers are salts and you throw the thing out of balance by having too much buffer. A little buffer doesn't do an awful lot of good from what I have been able to find out. So, if you put enough buffer salts in to take care of that pickle acid, you have so much that you raised the entire salt concentration of your solution high enough so that some of the soap may be actually salted out of the solution.

It is inherently soluble but floats on the solution, and wouldn't do its job of dispersing the fats, keeping them dispersed. I don't recommend it and I wouldn't do it.

A Member: I don't know whether it is peculiar to our plant or not, but I wonder if it has something to do in our compound maintenance. A 26 gage copper is the smallest we draw, and we batch anneal that, and every so often we are troubled with stickiness, getting the wire off the spool. We are noticing that it ties in somewhat with the time that we changed to a new tank of compound. After we change, maybe within a week or two, the stickiness has gone up and it starts to go down again. I don't know whether it is something that we could do to our compound that could be changed to eliminate that carry-over from one compound to another.

Dr. Williams: Have you followed a pH study on that?

From what I am guessing, and I am not saying that is it, you may have enough copper soap build-up and by that I mean, in this case, a certain amount of that copper soap carried in suspension where you are getting a smearing of that on the wire, and then when it is annealed in tight, close-wound content, you might get some sticking as a result.

A Member: I was wondering if it tied in with that statement you made of the detergency of the compound of cleaning the machine system and—

Dr. Williams: That could be.

A Member: And then it redeposits on the wire?

Dr. Williams: It could be and is embarrassing sometimes.

A Member: I would like to ask one more question. Do you have any comment on control of the solution with regard to cleanliness, wire cleanliness; that is, a possible smudge or at least something that you can wipe off or see? Is there anything that should be controlled that may influence that?

Dr. Williams: If you have got a bad smudge on the wire, one thing will benefit it, and that is raising the pH, but whether you will throw yourself off somewhere else, I don't know; a higher pH will generally give you a cleaner wire. That is as near as I can come to it. Old solutions may give dirtier wire.

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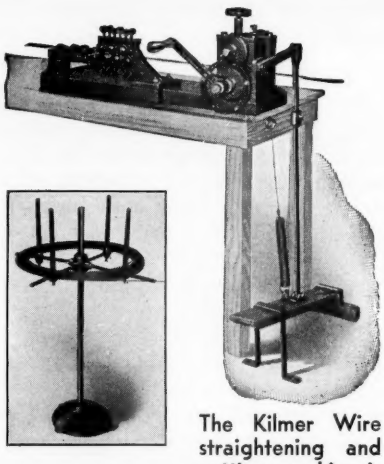

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The Annual Convention of The Wire Association at Cleveland

(*Continued from page 41*)

The Plant Visits

The entire day of Thursday, the 13th, was devoted to plant visitations. Busses took some 270 members and guests to A. S. and W's Cuyahoga Works in the morning on a plant tour that had been arranged by S. R. Snow of the host company. The plant is large, well-equipped and devoted to two products in the main—wire and strip. Guests were conducted through the wire mill first, where from the heating of billets and their rolling, they saw various stages of wire drawing and processing. Following this, a tour of their excellent strip plant was made.

★ ★ ★

In the afternoon 102 persons visited the Upson Road and Babbitt Road plants of the Chase Brass and Copper Company, a trip arranged by A. T. Both, General Superintendent of their Cleveland Mill Division. In the two extensive plants through which their guests were conducted in small groups, they saw the casting of ingots and the progressive steps by which these copper, brass, bronze and other non-ferrous alloys were formed into rod, bar, sheet, strip, plate, tube, pipe, and extruded and drawn shapes.

★ ★ ★

Both mills were humming with activity, but the most impressive aspects of the visit was the efficient layout of the plant and its excellent up-to-date equipment. Although in the Babbitt Road plant, tubing production seemed to dominate the scene, the rod production facilities, in which rods were extruded, drawn, straightened and cut for bolts, nuts and other products, were large and well-worth seeing.

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ning as a result of Howard H. Allen's paper on bunched copper wire conductors delivered at the Waterbury Regional Meeting in September.

★ ★ ★

Richard E. Brown, the Association's Executive Secretary, called the meeting to order, described the problem and, after requesting the 31 non-ferrous bare and electric wire and cable men present to elect a chairman, retired. J. R. Garey, Purchasing Agent, William Brand and Company, Willimantic, Conn., was unanimously chosen to serve as chairman. He stated the problem as one in which commercial and government specifications for stranded and bunched wires were at variance, resulting in undue complications for the wire producers. In the discussions that followed it was the census of opinion that even commercial specifications vary widely for the same end uses and that often government agencies appear to be specifying types of wire they did not really need nor actually want. It was also brought out that a need for stand-

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ard definitions existed, inasmuch as several terms are frequently used for the same item and yet these terms often mean different things to different people. A need to educate both commercial and government buyers was felt to be desirable.

★ ★ ★

Among other problems brought to light is that specifications frequently do not take into account available equipment. It was felt that wire specifications should be concerned with this factor, especially in periods of national emergency.

★ ★ ★

The discussions at the meeting were recorded and copies sent to each man in attendance. A committee of six, Vincent Mc Bride, T. Y. Henry, J. G. Tomey, S. E. Luques, P. V. Kelley and Howard H. Allen, was appointed to meet with Mr. Garey to boil the discussions down to essentials, which summary is to be brought before the next A.S.T.M. meeting in January by Benoit J. Sirois of Phelps Dodge, accompanied by the committee.

Conclusion

The 1952 Annual Convention was a great meeting. Technical papers were of an excellent calibre. The luncheon, the Smoker-Dinner and its show, the plant inspections, all ran smoothly. Our meeting chairman and our speakers did an outstandingly fine job—all of which had been preceded by a year of hard and intelligent work on the part of The Program Committees, to whose successful efforts we can well be grateful. Nor should we fail to record the excellent and efficient work of the management and staff of The Hotel Carter, without whose cooperation the Convention could not have functioned so smoothly.

★ ★ ★

The cordial and sincere appreciation of the directors, officers and members of The Wire Association is hereby extended to each and every man who contributed so generously of time and effort to make this Convention a memorable occasion.

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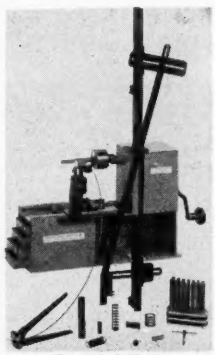

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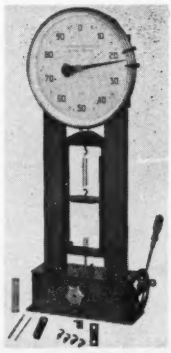

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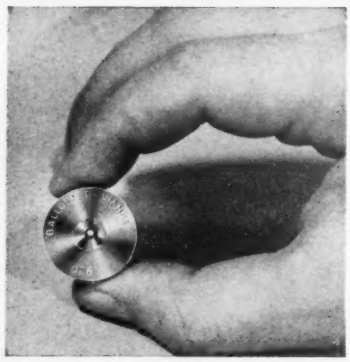

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New Crane Signals Chart Lists Safe Loads for Slings

A new wall chart (first shown at the recent National Safety Congress) has been released by **Macwhyte Company,** Sling Manufacturers.

★ ★ ★

Chart combines crane signals and suggestions for proper use of slings on one side. On the other side, are tables listing Strengths and Safe-Loads for ATLAS 8-Part Braided Slings and MONARCH Single-Part Slings. Sling Strengths shown run from 4/10ths of a ton to 243.4 tons.

★ ★ ★

Wall Chart is 11" x 14" printed in two colors and may be obtained by asking for chart 5237 from Macwythe Company, Sling Department, Kenosha, Wisconsin.

★ ★ ★

Heads Purchasing At Harper Electric

G. Gerald Misener has been appointed purchasing agent of the **Harper Electric Furnace Corporation,** 39 River Street, Buffalo, N. Y. He joined the company in February, 1947.

Three Score and Ten Years of Wire Making

(*Continued from page* 33)

type — no wonder — the blouses worn in that day and age were so tight, no straps were necessary.

★ ★ ★

Of course, among my own fond memories are the trials and tribulations which were a part of the

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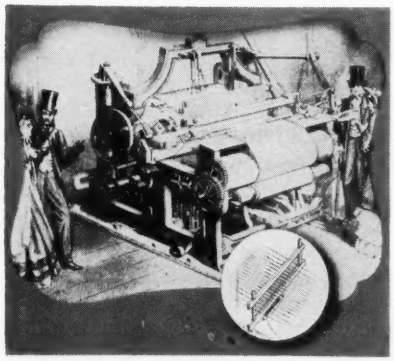
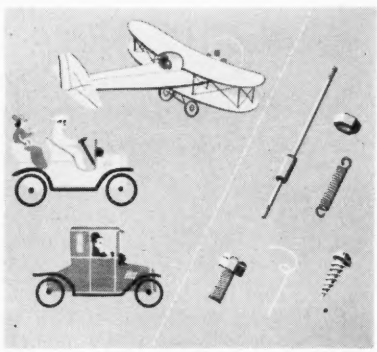
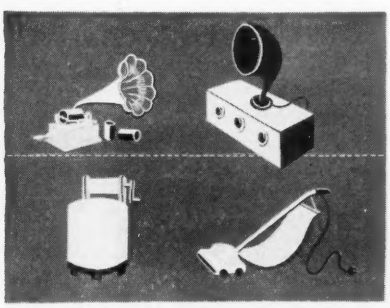
textile wire development. Reed wire was one of the Igoe Bros. specialty items, and I hope you will pardon me if I say we were specialists in the manufacture of this difficult product, and the only mill in the country at the time who could make a reed wire suitable for weaving silk.



The rest of the story, most of you know from your own experiences. From 1900 to 1920 markets increased, new products came along fast—the automobile, the airplane—and the many bolts, nuts, springs and screw machine products they required.



The phonograph, the radio, appliances such as the vacuum cleaner and the washing machine—each industry seemingly attempting to outdo the other in consuming wire.



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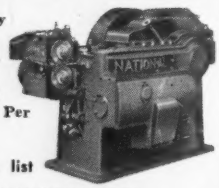
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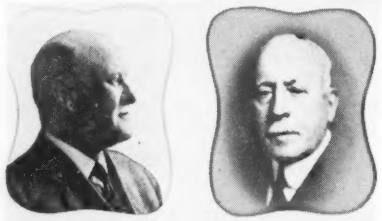
Yes, as I told that young man in my office, my first choice as to a career remains the Wire Industry —even after 70 active years in this business.

★ ★ ★

Now a great deal has happened since Jack Mordica worked in New Castle and James Farrell worked in Beaver Falls. Great strides were made in the wire industry during their time, and great things are still happening today—new methods of manufacture—new products and uses—new steels.

★ ★ ★

Learn what lessons possible from the past—then turn to the future —for I am certain that tremendous things lie ahead, and let me state that I consider this wire business of ours the most essential, important, and interesting branch of the metal business.



Left: John Mordica Right: James A. Farrell

New Folder Describes Electric Furnaces

Harper Electric Furnace Corporation, 39 River Street, Buffalo 2, N. Y., has issued a folder describing and illustrating their complete line of furnaces, which include pusher, mesh belt, elevator, pit, car-bottom, box, billet and bar and wire annealing types.

★ ★ ★

Their electric wire furnaces of the continuous tube type for annealing alloy steels in hydrogen atmosphere have been found of particular interest to the wire industry because of their ability to maintain uniform high temperatures and accurately controlled atmosphere during a slow anneal.

★ ★ ★

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Sheet and Tube Appointments

John M. Tuthill, for nearly three years manager of flat rolled sales, in general offices of **The Youngstown Sheet and Tube Company** at Youngstown, has been appointed assistant general manager of sales with offices in Chicago. He succeeds Arthur M. Long who died on May 24th.

★ ★ ★

L. E. Arnold, transferred from the Detroit sales office to general offices here early in 1950 as assistant manager of flat rolled sales, succeeds Tuthill as manager of that department.

★ ★ ★

Both appointments became effective Monday, Nov. 10.

Paul R. Rauch, of Struthers, O., has been appointed assistant chief inspector for the Youngstown district of **The Youngstown Sheet and Tube Company.** His offices are at the Campbell plant.

★ ★ ★

Mr. Rauch, a native of Leetonia, attended grade school there, South High School in Youngstown and night classes at Youngstown College. He supplemented these studies with night school work in English, accounting, chemistry and metallurgy.

★ ★ ★

He joined The Youngstown Sheet and Tube Company in 1939 as an inspector in Brier Hill Electric Weld. Four months later he was transferred to Cold Strip inspection at Campbell. In April, 1942, he became master gauger at the Tube Mills, was promoted to day foreman of Rod and Wire inspection Aug. 1, 1942, and general foreman of Campbell Works inspection May 1, 1951.

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WHERE TO BUY

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ABRASIVES—
Ace Abrasive Laboratories, New York, N. Y.
Elgin National Watch Co., Abrasive Div., Elgin, Ill.
Norton Co., Worcester, Mass.

ACID INHIBITORS—
(See Inhibitors, Pickling)

ACID-PROOF CONSTRUCTION—
Ceilcote Company, Cleveland, Ohio
Chemical Construction Co., Pittsburgh, Pa.
Haveg Corporation, Newark, Del.

ANNEALING MACHINES — Electric Resistance
Syncro Machine Co., Perth Amboy, N. J.
Trauwood Engr. Co., Cleveland. O.

ANNEALING POTS AND BOXES—
Scudder, E. J. Fdry. & Mach. Co., Trenton, N. J.

BAKERS—(See OVENS—Rod Bakers)

BOBBINS—Braider & Wire Weaving
Apco Mossberg Co., Attleboro, Mass.
Milton Machine Works, Inc., Milton, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Standard Mill Supply Co., Pawtucket, R. I.
Wire & Textile Mach'y, Inc. (used) Pawtucket. R. I.

BORAX—Wire Drawing
Pacific Coast Borax Co., New York, N. Y.

BORON CARBIDE—
Norton Co., Worcester, Mass.

BRAKES—Pneumatic
Entwistle, Jas. L. Co., Providence, R. I.

CARRIERS—Braider, High Speed
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Wire & Textile Mach'y, Inc. (used) Pawtucket. R. I.

CARTONS—Paper
(See CONTAINERS—Paper, for nails, etc.)

CASTINGS—Wire Mill
Scudder, E. J. Fdry. & Mach. Co., Trenton, N. J.

CEMENTS—Acid Proof
Ceilcote Company, Cleveland, Ohio

CEMENTS—Refractory
Norton Co., Worcester, Mass.

CLEANERS—Metal
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Phila., Pa.
Metal & Thermit Corp., New York, N. Y.
Parkin Chemical Co., The, Pittsburgh, Pa.
Standard Industrial Compounds Co., Chicago.

CLEANING & PICKLING EQUIP.—
Ceilcote Company, Cleveland, Ohio
Chemsteel Construction Co., Pittsburgh, Pa.
Cleveland Tramrail Div., of the Cleveland Crane & Engineering Co., Wickliffe, O.
Haveg Corporation, Newark, Del.
Holden, A. F., Company, The, Detroit, Mich.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, Ohio
Wilson, Lee, Engr. Co., Cleveland, Ohio
Youngstown Welding & Eng'g' Co., Youngstown, Ohio

CLOTH—WIRE, All Metals
Chase Brass & Copper Co., Waterbury, Conn.
Wickwire Bros., Cortland, N. Y.

COATING COMPOUNDS—
Apex Alkali Products Co., Philadelphia, Pa.
Miller, R. H., Co., Inc., Homer, N. Y.
Standard Industrial Compounds Co., Chicago.

COMPOUNDS—Coppering
American Chemical Paint Co., Ambler, Pa.

COMPOUNDS—Diamond (Pre-Mixed)
Eastern Carbide Corp., New Rochelle, N. Y.
Elgin National Watch Co., Abrasives Div., Elgin, Ill.
Hyprez Div., Engis Equipment Co., Chicago.

COMPOUNDS—Extrusion, for Wire
(See Compounds—Vinyl)

COMPOUNDS—For Improving Drawing and Extrusion
American Chemical Paint Co., Ambler, Pa.

COMPOUNDS—Metal Finishing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Metal & Thermit Corp., New York, N. Y.

COMPOUNDS—Phosphate Coating
American Chemical Paint Co., Ambler, Pa.

COMPOUNDS—Rust Preventing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.

COMPOUNDS—Rust Removing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Standard Industrial Compounds Co., Chicago.

COMPOUNDS—Vinyl, for Wire
Electronic Rubber Co., Stamford, Conn.

COMPOUNDS—Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Bick, Hans C., Inc., Reading, Pa.
Miller, R. H. Co., Inc., Homer, N. Y.
Nopco Chemical Co., Harrison, N. J.
Pacific Coast Borax Co., New York, N. Y.
Standard Industrial Compounds Co., Chicago.
Swift & Company, Chicago, Ill.

CONDUCTORS—Flexible, Electrical
Montgomery Co., The, Windsor Locks, Conn.

COPHOLDERS—Steel
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Wire & Textile Mach'y, Inc. (used) Pawtucket. R. I.

CORDS—Electrical, Tinsel Conductor
Montgomery Co., The, Windsor Locks, Conn.

CORROSION PREVENTIVE PAPERS—
Angier Corporation, The, Framingham, Mass.

CRANES—Wire Mill
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

CUTTING TOOLS—Carbide
Carboloy Dept. of General Electric Co., Detroit.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Metal Carbides Corporation, Youngstown, Ohio
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.

CUTTING TOOLS—Wire
Manco Manufacturing Co., Bradley, Ill.
Porter, H. K. Inc., Somerville, Mass.

DIAMONDS—Industrial
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIAMOND POWDERS—
Ace Abrasive Laboratories, New York, N. Y.
American Coldset Corp., Paterson, N. J.
Danforth, The C. W. Co., Youngstown, Ohio
Elgin National Watch Co., Abrasive Div., Elgin, Ill.
Hyprez Div., Engis Equipment Co., Chicago, Ill.
Indiana Wire Die Co., Ft. Wayne, Ind.
Industrial Diamond Powders, New Kensington, Pa.
National Research Company, St. Claire Shores, Mich.
New England Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIAMOND POWDER RECLAIMING—
Boulin, Victor J., Inc., New York, N. Y.
Danforth, The C. W. Co., Youngstown, Ohio
Industrial Diamond Powders, Inc., New Kensington, Pa.
National Research Co., St. Claire Shores, Mich.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.

DIAMOND TOOLS—
Carboloy Dept. of General Electric Co., Detroit.
Indiana Wire Die Co., Ft. Wayne, Ind.
Metal Carbides Corporation, Youngstown, Ohio
Wayne Wire Die Co., Hillside, N. J.

DIES—Carbide, Tungsten & Tantalum
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., Inc., New York, N. Y.
Carboloy Dept. of General Electric Co., Detroit.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Wayne Wire Die Co., Hillside, N. J.

DIES—Cold Heading
Carboloy Dept. of General Electric Co., Detroit.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Indiana Wire Die Co., Ft. Wayne, Ind.
Metal Carbides Corporation, Youngstown, Ohio
Vascoloy-Ramet Corp., No. Chicago, Ill.

DIES—Diamond
Ajax Industrial Supplies, Inc., Fort Wayne, Ind.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., Inc., New York, N. Y.
Cochaud Wire Die Corp., New York, N. Y.
Ft. Wayne Wire Die, Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
New England Wire Die Co., Worcester, Mass.
North American Philips Co., Inc., New York.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIES—Extrusion
Carboloy Dept. of General Electric Co., Detroit.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Metal Carbides Corporation, Youngstown, Ohio
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIES—Eyelet
Eastern Carbide Corp., Now Rochelle, N. Y.
Kelly Wire Die Corp., New York, N. Y.

DIES—Pointing
Sjogren Tool and Machine Co., Auburn, Mass.

DIES—Repairs & Re-Cutting
Ajax Industrial Supplies, Inc., Fort Wayne, Ind.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., Inc, New York, N. Y.
Carboloy Dept. of General Electric Co., Detroit.
Cochaud Wire Die Corp., New York, N. Y.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Ft. Wayne Wire Die., Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corporation, Youngstown, Ohio
New England Wire Die Co., Worcester, Mass.
North American Philips Co., Inc., New York.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Wayne Wire Die Co., Hillside, N. J.

DIES—Special Shapes, Etc.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Indiana Wire Die Co., Ft. Wayne, Ind.

DIES—Swaging
Sjogren Tool and Mach. Co., Inc., Auburn, Mass.

DIES—Tube Drawing
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Carboloy Dept. of General Electric Co., Detroit.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.

DRAW BENCHES—
(See MACHINERY—Draw Benches)

DRUMS & TRAVERSES—Flange Steel
Entwistle, Jas. L. Co., Providence, R. I.
Republic Steel Corp., Pressed Steel Div., Niles, Ohio

DRYING EQUIPMENT
Carl-Mayer Corp., The, Cleveland, Ohio
Industrial Ovens, Inc., Cleveland, Ohio.
Rockwell, W. S. Co., Fairfield, Conn.

ENGINEERS—Consulting
Metal Fatigue—Fatigue of Materials Laboratory, Princeton, N. J.
Wire Insulating and Rubber and Plastics Processing—Hale and Kullgren, Inc., Akron, Ohio
Zinc—Imhoff, Wallace G., Co., No. Highlands, Calif.

EYELETS—Brass or Zinc
Platt Bros. & Co., The, Waterbury, Conn.

FENCING & FENCES—Wire
Interlocking Fence Co., Morton, Ill.

FOAM PRODUCING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Parkin Chemical Co., The, Pittsburgh, Pa.

FURNACES—Brazing
Electric Furnace Co., Salem, Ohio
Harper Electric Furnace Corp., Buffalo, N. Y.
Rockwell, W. S. Co., Fairfield, Conn.
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

FURNACES—Galvanizing Equipment
Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio
Holden, A. F. Co., The, Detroit, Mich.
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio
Trauwood Engineering Co., The, Cleveland, Ohio
Wilson, Lee, Engr. Co., Cleveland, Ohio

WHERE TO BUY, Continued

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.

FURNACES—Heat Treating
Ajax Electric Co., Inc., Philadelphia, Pa.
Carl Mayer Corp., The, Cleveland, Ohio
Electric Furnace Co., Salem, Ohio
Holden, A. F., Co., The, Detroit, Mich.
Morrison Industries, Bedford, Ohio
Rockwell, W. S., Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio
Trauwood Engr. Co., Cleveland, Ohio
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.
Wilson, Lee, Engr. Co., Cleveland, Ohio

FURNACES—Lead Melting
Electric Furnace Co., Salem, Ohio
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

FURNACES—Pot (oil, gas, electric)
Ajax Electric Co., Inc., Philadelphia, Pa.
Holden, A. F., Co., The, Detroit, Mich.
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

FURNACES—Resistance Heating, Strand
(See Annealing Machines)

FURNACES—Salt Bath
Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio
Holden, A. F., Co., The, Detroit, Mich.
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

GALVANIZING EQUIPMENT — (See MACHINERY—Galvanizing Wire)

GRINDERS—Roll
Norton Co., The, Worcester, Mass.

GUIDES—for Wire
Heany Industrial Ceramic Corp., New Haven Conn.

HAMMERS—Swaging
Sjogren Tool and Machine Co., Auburn, Mass.

HOOKS—Pickling & Liming
Youngstown Welding & Eng'g' Co., Youngstown, Ohio

HOISTS—Electric Travelling
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio

IMPREGNATING MATERIALS—
Solar Compounds Corporation, Linden, N. J.

INHIBITORS—Pickling
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Parkin Chemical Co., The, Pittsburgh, Pa.

INSULATING MATERIALS—
Electronic Rubber Co., Stamford, Conn.
Glass Fibres, Inc., Toledo
Heineman Corp., Oscar, Chicago, Ill.
Merrimac Paper Co., New York, N. Y.
New England Lacquer Co., E. Providence, R. I.
Solar Compounds Corporation, Linden, N. J.
Solar Varnish Corp., Linden, N. J.

INSULATING MATERIALS — Paper—For Electric Wire Cable
Merrimac Paper Co., New York, N. Y.
Solar Compounds Corporation, Linden, N. J.
Solar Varnish Corp., Linden, N. J.

LACQUERING SYSTEMS — See MACH.—Lacquering Electric Wire

LACQUERS—For Electric Wire
New England Lacquer Co., E. Providence, R. I.
Solar Compounds Corporation, Linden, N. J.

LAME—LAHN—
Montgomery Co., The, Windsor Locks, Conn.

LIME—
Warner Co., Philadelphia and Bellefonte, Pa.

LUBRICANTS — For Metal Cutting, Stamping and Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Miller, R. H., Co., Inc., Homer, N. Y.
Nopco Chemical Co., Harrison, N. J.
Standard Industrial Compounds Co., Chicago.

LUBRICANTS—Wire Drawing
(See Compounds—Wire Drawing)

LUBRICANTS—Wire Rope
Swift & Co., Chicago, Ill.

LUMBER—Wire Mill, Carload shipments for lagging and car blocking
North Anson Reel Co., No. Anson, Me.

MACHINERY—Armoring (Cable, Wire, Hose)
American Insulating Mach'y Co., Phila., Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc., (used), Pawtucket, R. I.

MACHINERY—Barbed Wire
Glader Machine Works, Chicago, Ill.
Wean Engineering Co., Cleveland, Ohio

MACHINERY—Bolts & Rivets
Meyer, Roth & Pastor Maschinenfabrik, Koln-Raderberg, Germany

MACHINERY—Braiding
Fidelity Machine Co., Inc., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Solomon, Michael, New York, N. Y.
Wardwell Braiding Mach. Co., Central Falls, R.I.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Bunching
Cook Manufacturing Co., The, Paterson, N. J.
Federal Manufacturing Co., Wallingford, Conn.
Haskell-Dawes Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Bundling, Scrap
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Cable, Electric
American Insulating Mach'y Co., Phila., Pa.
Fidelity Machine Co., Inc., Philadelphia, Pa.
Haskell-Dawes Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Capstans (See Machinery—Winding Wire)

MACHINERY—Chain Making
Meyer, Roth & Pastor Maschinenfabrik, Koln-Raderberg, Germany
Nilson, A. H. Machine Co., Bridgeport, Conn.

MACHINERY—Closing Rope
Watson Machine Co., Paterson, N. J.

MACHINERY—Coiling Rod
Vaughn Mach'y Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Cold Heading
Waterbury-Farrel Fdry. Mach. Co., Waterbury, Conn.

MACHINERY—Copper Wire Drawing
Aetna-Standard Engineering Co., Pittsburgh.
American Insulating Mach'y Co., Phila., Pa.
Hale and Kullgren, Inc., Akron, Ohio
National Mach'y Exch. (Used), New York.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Covering Wire (See MACHINERY—Insulating Wire)

MACHINERY—Cutting
Eisler Engineering Co., Newark, N. J.
Lewis Machine Co., The, Cleveland, Ohio
Manco Manufacturing Co., Bradley, Ill.
Mettler Machine Tool, Inc., New Haven, Conn.
Porter, H. K., Inc., Somerville, Mass.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Descaling Rod, Dry
Fisher Associates, New York, N. Y.

MACHINERY—Die Making
American Optical Co., Instrument Div., Buffalo, N. Y.
Victor J. Boulin, Inc., New York, N. Y.
Carboloy Dept. General Electric Co., Detroit, Mich.
Firth Sterling, Inc., Pittsburgh, Pa.
Kelly Wire Die Corp., New York, N. Y.
Dykrex Corp., Roos Tool & Mfg. Div., Newark, N. J.
Wayne Wire Die Co., Hillside, N. J.

MACHINERY—Draw Benches
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wartenweiler, Emilo, Milano, Italy

MACHINERY—Edging (See MACHINERY — Tandem Rolling and Edging Mills)

MACHINERY—Enameling
American Insulating Mach'y Co., Phila., Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Industrial Ovens, Inc., Cleveland, Ohio
Michigan Oven Co., Detroit, Mich.

MACHINERY—Extruding
Aetna-Standard Engineering Co., Pittsburgh.
Hale and Kullgren, Inc., Akron, Ohio
Hartig Engine & Machine Co., Hillside, N. J.
National Rubber Machinery Co., Akron, Ohio
Royle, John, & Sons, Paterson, N. J.
Standard Machinery Co., Mystic, Conn.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Fence
Glader, Wm., Machine Works, Chicago, Ill.
Interlocking Fence Co., Morton, Ill.
Malmedie Maschinenfabrik, Dusseldorf, Germany
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Filament Coil Winding
Eisler Engineering Co., Newark, N. J.

MACHINERY—Flat Wire
Mettler Machine Tool, Inc., New Haven, Conn.
Wean Equipment Corp. Cleveland, Ohio

MACHINERY—Forming Wire
Baird Machine Co., Stratford, Conn.
Nilson, A. H., Machine Co., Bridgeport, Conn.

MACHINERY—Galvanizing Wire
Sleeper & Hartley, Inc., Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, O.
Wilson, Lee, Engr. Co., Cleveland, Ohio

MACHINERY—Gang Winders
Entwistle, Jas. L. Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Grinding
Norton Co., The, Worcester, Mass.

MACHINERY—Insulating Wire
Aetna-Standard Engineering Co., Pittsburgh, Pa.
American Insulating Mach'y Co., Phila., Pa.
Ets. Pourtier Frères, Romainville, France
Fidelity Machine Co., Inc., Philadelphia, Pa.
Hale and Kullgren, Inc., Akron, Ohio
Hartig Engine & Machine Co., Hillside, N. J.
National Rubber Machinery Co., Akron, Ohio
New England Butt Co., Providence, R. I.
Royle, John & Sons, Paterson, N. J.
Solomon, Michael, New York, N. Y.
Syncro Machine Co., Perth Amboy, N. J.
Wardwell Braiding Mach. Co., Central Falls, R.I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Knitting
Fidelity Machine Co., Inc., Philadelphia, Pa.

MACHINERY—Lacquering Electric Wire
American Insulating Mach'y Co., Philadelphia.
Industrial Ovens, Inc., Cleveland, O.

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Looms, Wire Weaving
Interlocking Fence Co., Morton, Ill.

MACHINERY—Material Handling
(See Material Handling Equipment)

MACHINERY—Measuring Wire & Cable
Davis Electric Co., Wallingford, Conn.
Durant Mfg. Co., Milwaukee, Wis.
Entwistle, Jas. L. Co., Providence, R. I.
New England Butt Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Nail and Tack
Baird Machine Co., The, Stratford, Conn.
Glader, Wm., Machine Works, Chicago, Ill.
Meyer, Roth & Pastor Maschinenfabrik, Koln-Raderberg, Germany
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Optical, for Dies
American Optical Co., Instrument Div., Buffalo, N. Y.

MACHINERY—Pickling
Chemsteel Construction Co., Pittsburgh, Pa.
Youngstown Welding & Eng'g. Co., Youngstown, Ohio

MACHINERY—Pin Making
Baird Machine Co., The, Stratford, Conn.

MACHINERY—Pointing
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Hale and Kullgren, Inc., Akron, Ohio
Meyer, Roth & Pastor Maschinenfabrik, Koln-Raderberg, Germany
Morgan Construction Co., Worcester, Mass.

WHERE TO BUY, Continued

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.

National Mach'y Exch. (Used), New York, N. Y.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Poulty Wire Fencing
Interlocking Fence Co., Morton, Ill.
Malmedie Maschinenfabrik, Dusseldorf, Germany
Wean Equipment Corp., Cleveland, O.

MACHINERY—Power Transmission
Reeves Pulley Company, Columbus, Indiana

MACHINERY—Pre-Heater for Wire (for Extrusion of Plastics)
Industrial Ovens, Inc., Cleveland, Ohio
National Rubber Machinery Co., Akron, Ohio

MACHINERY—Re-Spoolers
Boyd & Sons Manufacturing Corp., Philadelphia, Pa.
Davis Electric Co., Wallingford, Conn.
Eisler Engineering Co., Newark, N. J.
Emory, Robert J., Co., Newark, N. J.
Entwistle, Jas. L. Co., Providence, R. I.
National Mach'y Exch. (Used), New York, N. Y.
Steel Equipment Co., Cleveland, Ohio
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.
Wean Equipment Corp., Cleveland, Ohio
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.
Wire Insulating Machy., Inc., Manchester, Conn.

MACHINERY—Rod Mill
Morgan Construction Co., Worcester, Mass.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Rolling Mill
Morgan Construction Co., Worcester, Mass.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Engineering Co., Cleveland, Ohio

MACHINERY—Rubber Insulating
National Rubber Machinery Co., Akron, Ohio
Royle, John & Sons, Paterson, N. J.
Standard Machinery Co., Mystic, Conn.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Spark Testing
Davis Electric Co., Wallingford, Conn.
Entwistle, Jas. L. Co., Providence, R. I.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Spring Making
Carlson Company, The, New York, N. Y.
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Wells, Frank L., Co., Kenosha, Wisc.

MACHINERY—Staple
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Straightening & Cutting
Kilmer, M. D., & Co., Cleveland, Ohio
Lewis Machine Co., The, Cleveland, Ohio
Medart Co., The, St. Louis, Mo.
Mettler Machine Tool Co., New Haven, Conn.
Meyer, Roth & Pastor Maschinenfabrik, Koln-Raderberg, Germany
National Mach'y Exch. (Used), New York, N. Y.
Wartenweiler, Emilio, Milano, Italy
Wells, Frank L., Co., Kenosha, Wisc.

MACHINERY—Stranding
Haskell-Dawes Machine Co., Philadelphia, Pa.
Hughesville Machine & Tool Co., Hughesville, Pa.
Milton Machine Works, Inc., Milton, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Swaging
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Take-Up and Pay-Out
Aetna-Standard Engineering Co., Pittsburgh, Pa.
American Insulating Mach'y Co., Phila., Pa.
Davis Electric Co., Wallingford, Conn.
Federal Manufacturing Co., Wallingford, Conn.
Hale & Kullgren, Inc., Akron, Ohio
Hartig Engine & Machine Co., Hillside, N. J.
Industrial Ovens, Inc., Cleveland, Ohio
Marshall-Richards Machine Co., Inc., Trenton, N. J.
Standard Machinery Co., Mystic, Conn.
Standard Mill Supply Co., Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.
Wire Insulating Machy., Inc., Manchester, Conn.

MACHINERY—Taping
American Insulating Mach'y Co., Phila., Pa.
Ets. Pourtier Frères, Romainville, France
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Testing, Physical
Scott Testers, Inc., Providence, R. I.

MACHINERY—Tinning Wire
American Insulating Mach'y Co., Phila., Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Steel Equipment Co., Cleveland, Ohio
Syncro Machine Co., Perth Amboy, N. J.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Tinsel Rolling Mills
American Insulating Mach'y Co., Phia., Pa.

MACHINERY—Trolley Wire
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill, Cold Drawing
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Hale & Kullgren, Inc., Akron, Ohio
Marshall-Richards Machine Company, Inc., Trenton, N. J.
Mettler Machine Tool. Inc., New Haven, Conn.

MACHINERY—Tube Winders
Solomon, Michael, New York, N. Y.

MACHINERY—Twinning
(See Mach.—Bunching)

MACHINERY—Twisters, Wire
Cook Manufacturing Co., The, Paterson, N. J.
Davis Electric Co., Wallingford, Conn.
Federal Manufacturing Co., Wallingford, Conn.
Haskell-Dawes Machine Co., Philadelphia, Pa.

MACHINERY—Used
National Machinery Exchange, New York, N. Y.
Solomon, Michael, New York, N. Y.
Wire & Textile Machy., Inc., Pawtucket, R. I.

MACHINERY—for Wire Welding (See WELDERS—Butt and Spot)

MACHINERY—Winding Wire
Eisler Engineering Co., Newark, N. J.
Entwistle, Jas. L., Co., Providence, R. I.
Federal Manufacturing Co., Wallingford, Conn.
Hartig Engine & Machine Co., Hillside, N. J.
New England Butt Co., Providence, R. I.
Standard Mill Supply, Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.
Wire Insulating Machy., Inc., Manchester, Conn.

MACHINERY—Wire Bending
Eisler Engineering Co., Newark, N. J.
Kilmer, M. D., & Co., Cleveland, Ohio

MACHINERY—Wire Drawing
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Hale & Kullgren, Inc., Akron, Ohio
Marshall-Richards Machine Co., Inc., Trenton, N. J.
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N. Y.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Wire Forming
Baird Machine Co., The, Stratford, Conn.
Kilmer, M. D., & Co., Cleveland, Ohio
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Wire Rope
Milton Machine Works, Inc., Milton, Pa.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wrapping with Paper
Angier Corporation, The, Framingham, Mass.
Marshall-Richards Machine C., Inc., Trenton, N. J.
Terkelsen Machine Co., Boston, Mass.

MATERIAL HANDLING EQUIPMENT—
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.

MILLS—Tandem, Rolling & Edging
Wean Equipment Co., Cleveland, Ohio

NAILS—Wire
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Wickwire Brothers, Inc., Cortland, N. Y.

OVENS—Cable Lacquering
American Insulating Mach'y Co., Phila., Pa.
Carl-Mayer Corp., The, Cleveland, Ohio.
Industrial Ovens, Inc., Cleveland, Ohio
Morrison Industries, Bedford, Ohio
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

OVENS—Rod Bakers
Carl-Mayer Corp., The, Cleveland, Ohio
Michigan Oven Co., Detroit, Mich.
Morrison Industries, Bedford, Ohio

OVENS—Welding Rod Coating
Carl-Mayer Corp., The, Cleveland, Ohio
Industrial Ovens, Inc., Cleveland, Ohio
Morrison Industries, Bedford, Ohio

PAINT—Acid Proof
Ceilcote Company, Cleveland, Ohio

PAINT BONDING CHEMICALS—
American Chemical Paint Co., Ambler, Pa.

PAINTS—Heat Resisting
American Chemical Paint Co., Ambler, Pa.
Solar Compounds Corp., Linden, N. J.

PAPER—Creped Wrapping
Angier Corporation, The Framingham, Mass.
Terkelsen Machine Co., Boston, Mass.

PAPER—For Coil Wrapping and Corrosion Prevention
Angier Corporation, The, Framingham, Mass.
Terkelsen Machine Co., Boston, Mass.

PATENT ATTORNEYS—
Lancaster, Allwine & Rommel, Washington, D. C.

PAY-OUT SYSTEMS—(See MACHINERY—Take-Up & Pay-Out)

PHOSPHATE COATING CHEMICALS — (See COMPOUNDS — Phosphate Coating)

PICKLING COMPOUNDS—
See (Inhibitors—Pickling)

PICKLING—Hooks, etc. Acid Resisting
Youngstown Welding & Eng'g' Co., Youngstown, Ohio

PICKLING TANK LININGS—
Chemsteel Construction Co., Pittsburgh, Pa.
Haveg Corp., Newark, Del.

PIPES & FITTINGS—Acid Resistant
Haveg Corp., Newark, Del.

POTS—Lacquer
Industrial Ovens, Inc., Cleveland, Ohio

PRESSES—Hydraulic and Mechanical
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Hale & Kullgren, Inc., Akron, Ohio
Standard Machinery Co., Mystic, Conn.

PULLERS AND GRIPS—For Wire
Morgan Construction Co., Worcester, Mass.
Scudder, E. J. Fdry & Mach. Co., Trenton, N. J.
Sjogren Tool and Machine Co., Auburn, Mass.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, Ohio

REEL AND TENSION STANDS—
Davis Electric Co., Wallingford, Conn.
Entwistle, Jas. L. Co., Providence, R. I.
Fidelity Machine Company, Inc., Philadelphia.
Industrial Ovens, Inc., Cleveland, Ohio
Kilmer, M. D., & Co., Cleveland, Ohio
Roll-A-Reel, Cincinnati, Ohio
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Mill Supply Co., Pawtucket, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire Insulating Machy., Inc., Manchester, Conn.

REEL CRUTCHES—
Roll-A-Reel, Cincinnati, Ohio
Watson Machine Co., Paterson, N. J.

REELS & SPOOLS—Aluminum Alloy
Milton Machine Works, Inc., Milton, Pa.

WHERE TO BUY, Continued

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.

REELS & SPOOLS—Annealing and Stranding
Apco Mossberg Co., Attleboro, Mass.
Howsam Spool Co., Aurora, Ill.
Milton Machine Works, Inc., Milton, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Republic Steel Corp., Pressed Steel Div., Niles, Ohio

REELS—Metal Bound
Durkee Mfg. Co., Pine River, Minn.
Howsam Spool Co., Aurora, Ill.
McCaskie, Inc., Wm., Westport, Mass.
North Anson Reel Co., No. Anson, Me.

REELS—Plywood
Carris Reels, Inc., Rutland, Vt.
McCaskie, Inc., Wm., Westport, Mass.
Nelson Company, The, Baltimore, Md.
Winchester Reel Co., Ashuelot, N. H.

REELS & SPOOLS—Steel (All Types)
Apco Mossberg Co., Attleboro, Mass.
Clark, J. L. Mfg. Co., Rockford, Ill.
Howsam Spool Co., Aurora, Ill.
Mason Can Company, East Providence, R. I.
Milton Machine Works, Inc., Milton, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Republic Steel Corp., Pressed Steel Div., Niles, Ohio

REELS—Wire Mill
Apco Mossberg Co., Attleboro, Mass.
Bridge Mfg. Co., The, Hazardville, Conn.
Carris Reels, Inc., Rutland, Vt.
Durkee Mfg. Co., Pine River, Mnn.
Dykrex Corp., Roos Tool & Mfg. Div., Newark, N. J.
Hamelin, J. Lumber & Woodwork, Ltd., Lachine, P. Q., Can.
Howsam Spool Co., Aurora, Ill.
Mason Can Company, East Providence, R. I.
Milton Machine Works, Inc., Milton, Pa.
McCaskie, Inc., Wm., Westport, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Mettler Machine Tool, Inc., New Haven, Conn.
Republic Steel Corp., Pressed Steel Div., Niles, Ohio
North Anson Reel Co., No. Anson, Me.
Winchester Reel Co., Ashuelot, N. H.

REELS & SPOOLS—Wooden
American Woodworking Co., Chicago, Ill.
Bridge Mfg. Co., Inc., The, Hazardville, Conn.
Carris Reels, Inc., Rutland, Vt.
Durkee Mfg. Co., Pine River Minn.
Hamelin, J., Lumber & Woodwork, Ltd., Lachine, P. Q., Can.
Nelson Company, The, Baltimore, Md.
North Anson Reel Co., No. Anson, Me.
Winchester Reel Co., Ashuelot, N. H.

REFRACTORIES—High Temperature
Norton Company, Worcester, Mass.

ROD BAKERS—(See Ovens—Rod Bakers)

RODS—Stainless Steel
American Steel & Wire Co., Cleveland, Ohio
Pittsburgh Steel Co., Pittsburgh, Pa.

RODS—Wire—Non-Ferrous
American Brass Co., The, Waterbury, Conn.
Platt Bros. & Co., The, Waterbury, Conn.

RODS—Wire, Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Indiana
Erie Iron & Supply Corp., Erie, Pa.
Gerber, J., & Co., Inc., New York, N. Y.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Company, Pittsburgh, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.

ROPE—Wire
American Steel & Wire Company, Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.

RUST PROOF COMPOUNDS—
(See Compounds—Rust Preventing)

RUST REMOVING COMPOUNDS—
(See Compounds—Rust Preventing)

SALTS—Heat Treating, Descaling, etc.
Holden, A. F., Co., The, Detroit, Mich.

SATURATION SYSTEMS—
Industrial Ovens, Inc., Cleveland, Ohio
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

SOAPS—Industrial and Wire Drawing
(See Compounds—Wire Drawing)

SODIUM—for Descaling
Holden, A. F., Co., The, Detroit, Mich.

SPOOLS—(See Reels & Spools)

SPOOLS—Stamped Metal for Retail Wire Sales
Clark, J. L. Mfg. Co., Rockford, Ill.
Mason Can Co., East Providence, R. I.

STAMPINGS—Steel
Mossberg Pressed Steel Corp., Attleboro, Mass.

STRIP—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Youngstown Sheet & Tube Co., Youngstown, O.

TANKS—Compound
Watson Machine Co., Paterson, N. J.

TANKS—Pickling and Plating
Ceilcote Company, Cleveland, Ohio
Chemsteel Construction Co., Pittsburgh, Pa.

TESTERS — INSULATION (See MACHINERY—Spark Testers)

TESTING EQUIPMENT (See MACHINERY Testing, Physical)

TINNING PROCESS—
Metal & Thermit Corp., New York, N. Y.

TINSEL—Electric Conductor
Montgomery Co., The Windsor Locks, Conn.

TINSEL WIRE—Resistance, Lame, Decorative Cords Thread—Bare Copper, Silver and False Gold Coated, etc. (See TINSEL—Electric Conductor)

TOOLS—Wire Cutting
Porter, H. K., Inc., Somerville, Mass.

TRAMRAIL SYSTEMS—
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.

TRANSMISSIONS—Variable speed (See Machy—Power Transmission)

TRAVERSES & DRUMS—For Reels
(See Drums & Traverses)

TRAVERSE MECHANISMS—
Apco Mossberg Co., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Niles Steel Products Div., Republic Steel Corp. Niles, Ohio
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.
Wire Insulating Machy., Inc., Manchester, Ct.

TUBE BENDERS AND FORMERS—
Kilmer, M. D., & Co., Cleveland, Ohio

VALVES & FITTINGS—Acid Resistant
Haveg Corp., Newark, Del.

VARNISHES—for Electric Wire
N. E. Lacquer Co., E. Providence, R. I.
Solar Varnish Corporation, Linden, N. J.

VULCANIZING PANS AND EQUIPMENT—
American Insulating Mach'y Co., Phila., Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Wire Insulating Machy., Inc., Manchester, Ct.

WELDERS—Spot and Butt
Fisler Engineering Co., Newark, N. J.
Micro Products Co., Chicago, Ill.

WIRE—Aluminum
Elmet Division, North American Philips Company, Inc., Lewiston, Maine
Malin & Co., Cleveland, Ohio
Seneca Wire & Manufacturing Co., Fostoria, O.

WIRE—Barbed
Gerber, J., & Co., Inc., New York, N. Y.
Interlocking Fence Co., Morton, Ill.

WIRE—Brass
Chase Brass & Copper Co., Waterbury, Conn.
Spencer Wire Corp., Union, N. J.

WIRE—Brush
Gerber, J., & Co., Inc., New York, N. Y.
Spencer Wire Corp., Union, N. J.

WIRE—Cast
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Cold Heading
American Steel & Wire Co., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Erie Iron & Supply Corp., Erie, Pa.
Gerber, J., & Co., Inc., New York, N. Y.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Seneca Wire & Manufacturing Co., Fostoria, O.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Copper
Chase Brass & Copper Co., Waterbury, Conn.
Gerber, J., & Co., Inc., New York, N. Y.
Spencer Wire Corp., Union, N. J.

WIRE—Flat, Fine
Anchor Wire Corp., Jamaica, L. I., N. Y.
Elmet Division, North American Philips Company, Inc., Lewiston, Maine
Gerber, J., & Co., Inc., New York, N. Y.
Montgomery Co., The, Windsor Locks, Conn.

WIRE—Forming
Erie Iron & Supply Corp., Erie, Pa.
Pittsburgh Cut Wire Co., Pittsburgh, Pa.

WIRE—Galvanized
Erie Iron & Supply Corp., Erie, Pa.
Gerber, J., & Co., New York, N. Y.

WIRE—Manufacturers
American Steel & Wire Co., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Continental Steel Corp., Kokomo, Ind.
Gerber, J., & Co., New York, N. Y.
Johnson Steel & Wire Co., Worcester, Mass.
Keystone Steel & Wire Co., Peoria, Ill.
Newbury Co., The, Boston, Mass.
Pittsburgh Steel Co., Pittsburgh, Pa.
Seneca Wire & Manufacturing Co., Fostoria, O.
Spencer Wire Corp., Union, N. J.
U. S. Steel Co., N. Y., N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Music
American Steel & Wire Co., Cleveland, Ohio
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Malin & Co., Cleveland, Ohio
Newbury Co., The, Boston, Mass.
Seneca Wire & Manufacturing Co., Fostoria, O.
Specialty Wire Co., Inc., Worcester, Mass.
Spencer Wire Corp., Union, N. J.

WIRE—Nickel Silver and Phosphor Bronze
Malin & Co., Cleveland, Ohio
Chase Brass & Copper Co., Waterbury, Conn.

WIRE—Oil Tempered
Pittsburgh Steel Co., Pittsburgh, Pa.

WIRE—Spring
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Erie Iron & Supply Corp., Erie, Pa.
Gerber, J., & Co., New York, N. Y.
Johnson Steel & Wire Co., Inc., Worcester.
Keystone Steel & Wire Co., Peoria, Ill.
Newbury Co., The, Boston, Mass.
Pittsburgh Steel Co., Pittsburgh, Pa.
Seneca Wire & Mfg. Co., Fostoria, Ohio
Specialty Wire Co., Inc., Worcester, Mass.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Stainless Steel
American Steel & Wire Co., Cleveland, Ohio
Firth Sterling, Inc., Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Specialty Wire Co., Inc., Worcester, Mass.
Wire Corporation, Worcester, Mass.

WIRE—Steel—Also Coppered and Galvanized Steel
Anchor Wire Corp., Jamaica, L. I., N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Erie Iron & Supply Corp., Erie, Pa.
Gerber, J., & Co., New York, N. Y.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Seneca Wire & Mfg. Co., Fostoria, Ohio
Spencer Wire Corp., Union, N. J.
U. S. Steel Export Co., New York, N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Straightening and Cutting
Erie Iron & Supply Corp., Erie, Pa.
Pittsburgh Cut Wire Co., Pittsburgh, Pa.
Wickwire Brothers, Inc., Cortland, N. Y.

WIRE—Tungsten
North American Philips Co., Inc., Allied Products Division, New York, N. Y.

WIRE—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

WRAPPING PAPER—Creped (See PAPER—Creped Wrapping)

YARNS & TAPES—
Belding Hemingway, New York, N. Y.
Glass Fibers, Inc., Toledo, Ohio

YARN TESTERS—
Heineman Corp., Oscar, Chicago, Ill.
Scott Testers, Inc., Providence, R. I.

The WATSON MACHINE COMPANY

ESTABLISHED 1845

PATERSON 3, NEW JERSEY, U. S. A.

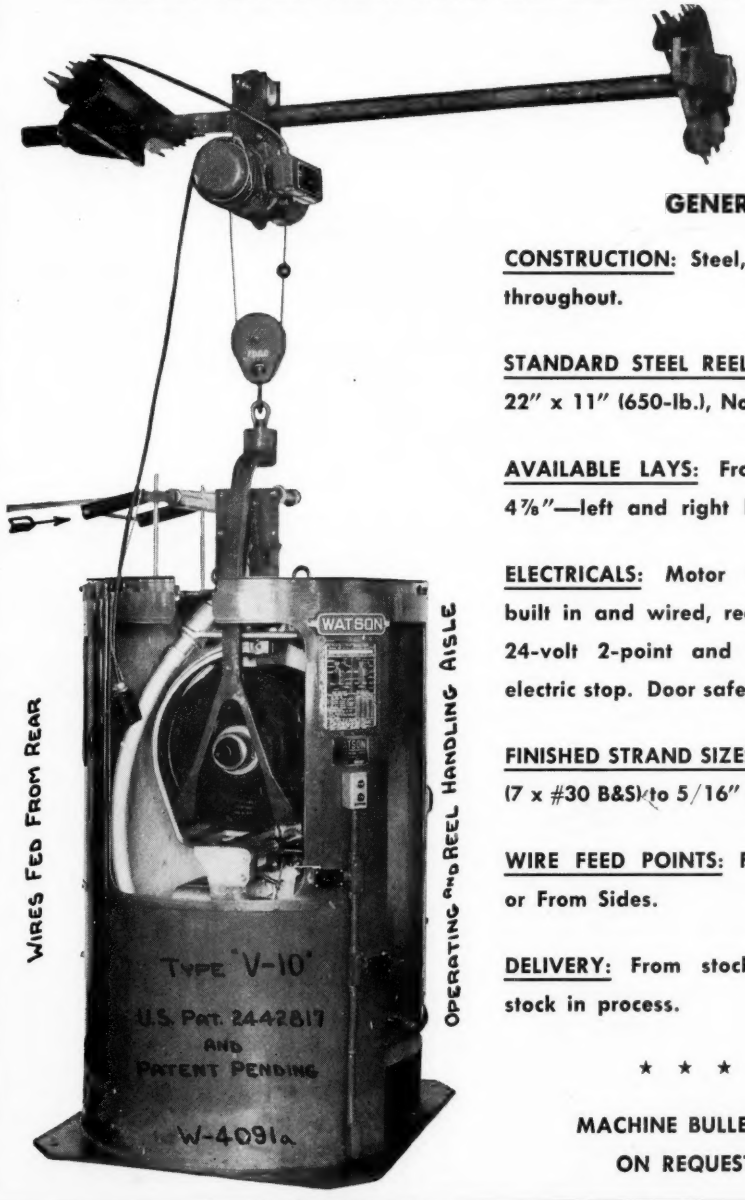
ELECTRICAL WIRE AND CABLE, WIRE ROPE, CORDAGE
AND MASTICATING MACHINERY MANUFACTURERS

WATSON

VERTICAL BUNCHERS TYPE "V"

IN WORLD-WIDE USE, THESE VERTICAL DESIGNS OFFER THE FOLLOWING OUTSTANDING ADVANTAGES:

1. HIGHEST POSSIBLE PRODUCTION AT LONG RUNS ON LARGE STANDARD WIRE TAKEUP REELS.
2. SMALLEST POSSIBLE FLOOR SPACE, AND IDEAL FOR ROW MOUNTING IN LIMITED SPACE.
3. LOW PURCHASE COST, ACHIEVED BY QUANTITY PRODUCTION.



GENERAL SPECIFICATIONS.

CONSTRUCTION: Steel, heat treated alloys and ball bearing throughout.

STANDARD STEEL REELS: No. 7—16" x 8" (250-lb.), No. 9—22" x 11" (650-lb.), No. 10—24" x 14" (1000-lb.).

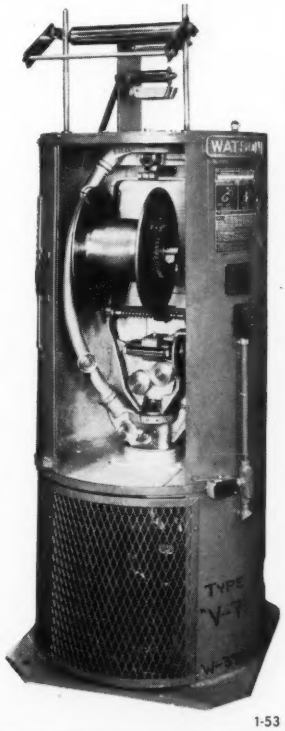
AVAILABLE LAYS: From 1/8" to 4 7/8"—left and right hand twist.

ELECTRICALS: Motor & Controls built in and wired, ready to run. 24-volt 2-point and extendable electric stop. Door safety switches.

FINISHED STRAND SIZES: From fine (7 x #30 B&S) to 5/16" dia. Strand.

WIRE FEED POINTS: Front, Rear, or From Sides.

DELIVERY: From stock, or from stock in process.



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MACHINE BULLETINS ON REQUEST

1-53

Remember

EF

builds
Gas, Oil and
Electric Furnaces

and recommends

without prejudice

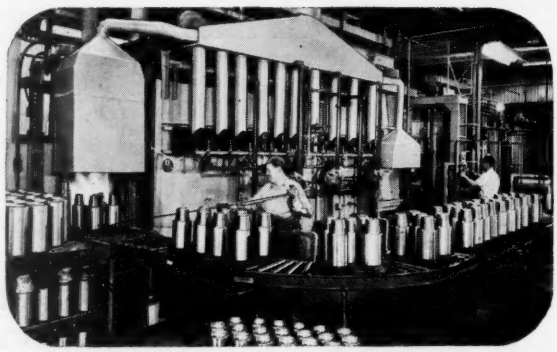
the one that suits

your requirements

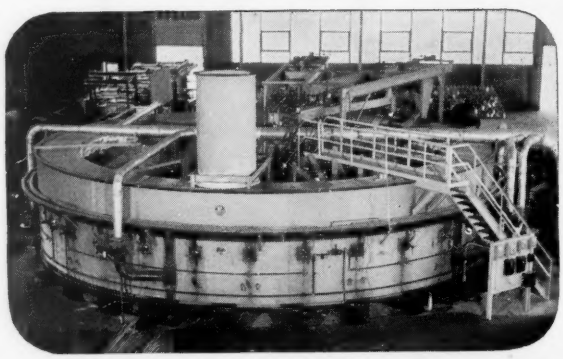
best!

Because we build all types of batch and continuous furnaces—in sizes to meet any production requirement—gas-fired, oil-fired, and electrically heated—we can recommend *without prejudice* the type—the size—and the method of heating—that suits all phases of *your particular* problem best.

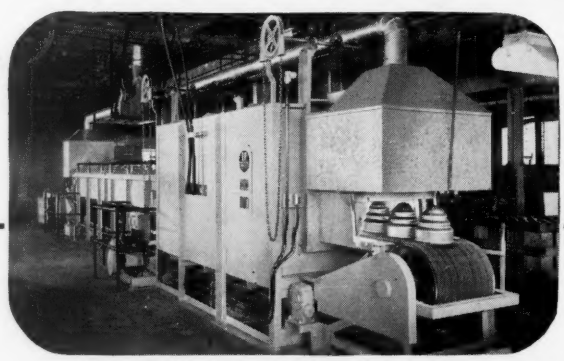
On your next annealing, brazing, hardening, solution treating, carbon restoration, carburizing or other heating or heat treating problem—investigate EF developments—available only in EF furnaces. We solicit your inquiries.



Gas-fired EF radiant tube continuous pusher-type furnace used for gas carburizing and other heat treating processes requiring several widely different cycles.



Oil-fired EF rotary furnace equipped with automatically controlled hydraulically operated charging and discharge mechanism —heats 35,000 lbs. of large billets per hour.



Electrically heated EF wire mesh belt conveyor furnace . . . for brazing, annealing, sintering, and other heat treating of aluminum, brass, copper and steel products.

EF

THE ELECTRIC FURNACE CO.

GAS FIRED, OIL FIRED AND ELECTRIC FURNACES
FOR ANY PROCESS, PRODUCT OR PRODUCTION

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